THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

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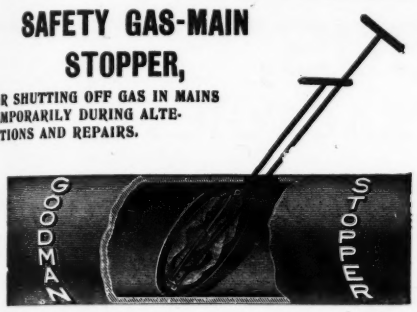

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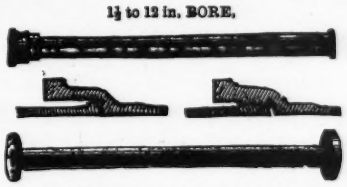

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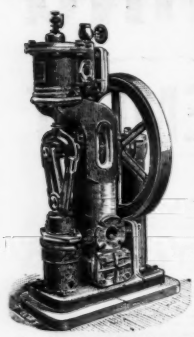

Fig. 705. "SINGLE RAM" STEAM-PUMP.

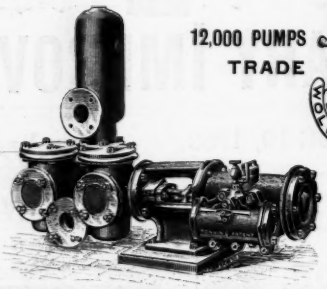

Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

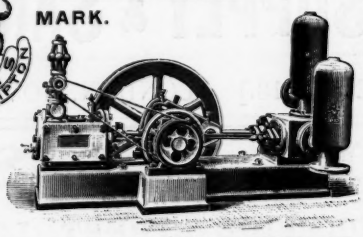

Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

Fig. 712. "DOUBLE-RAM" STEAM-PUMP.

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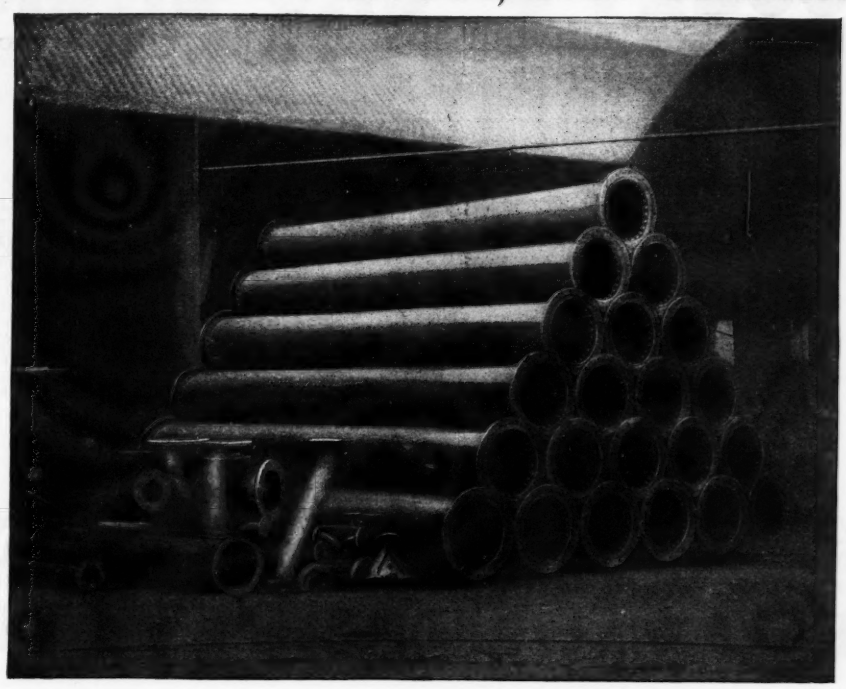

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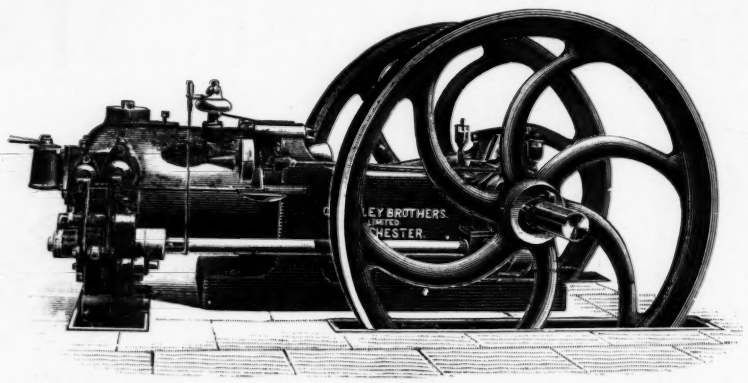

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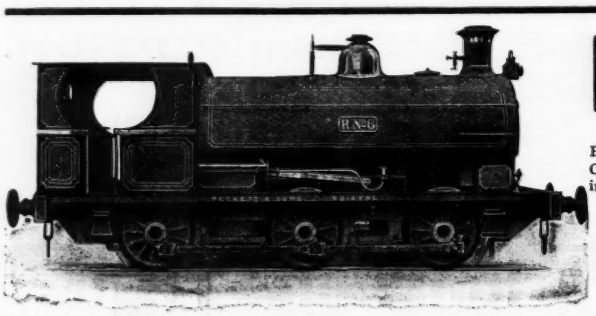

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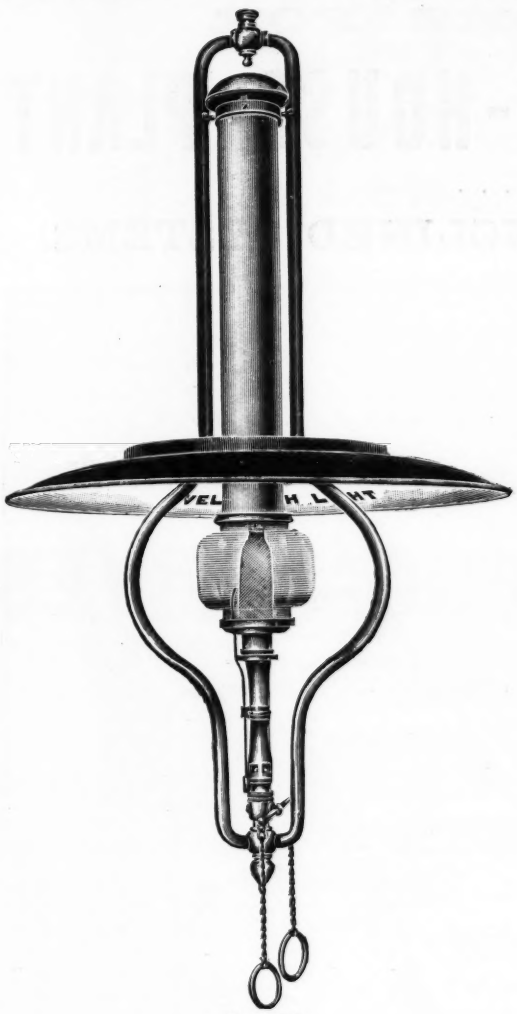

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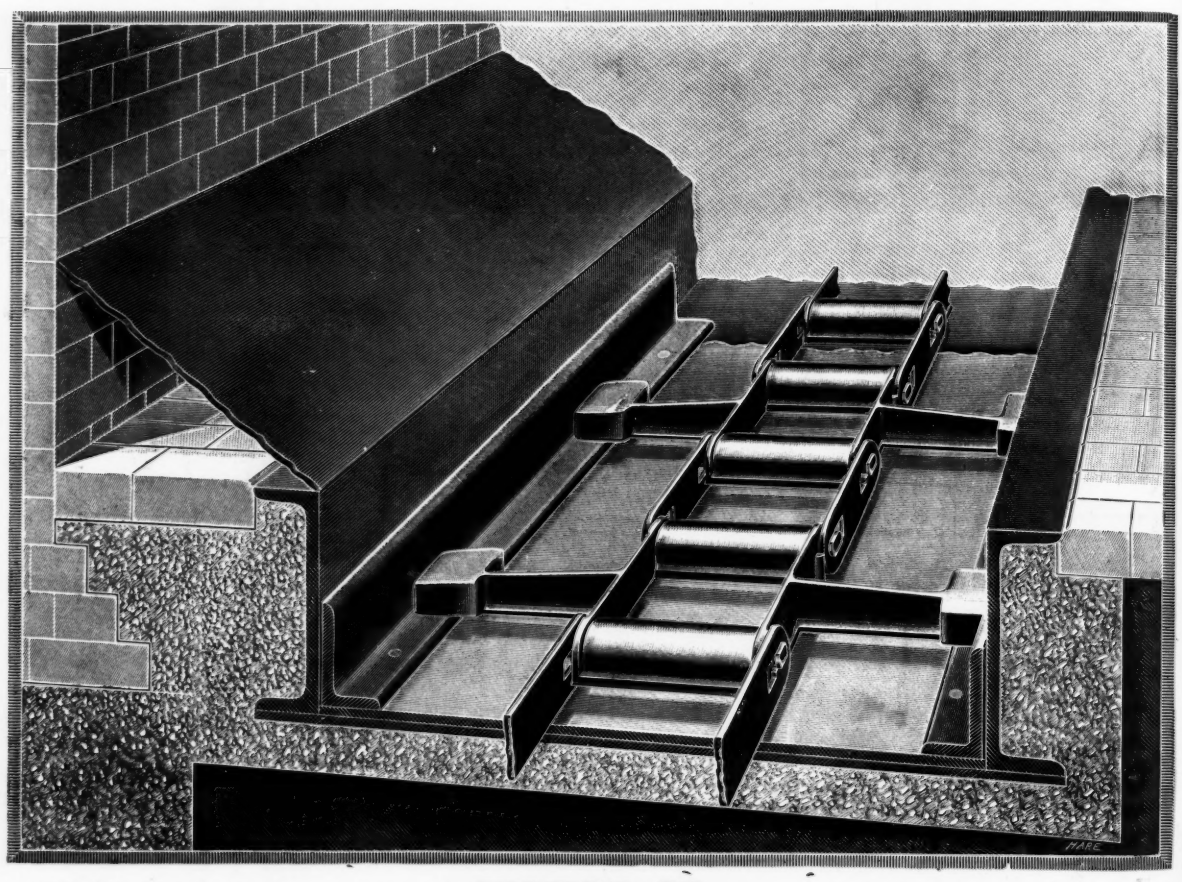

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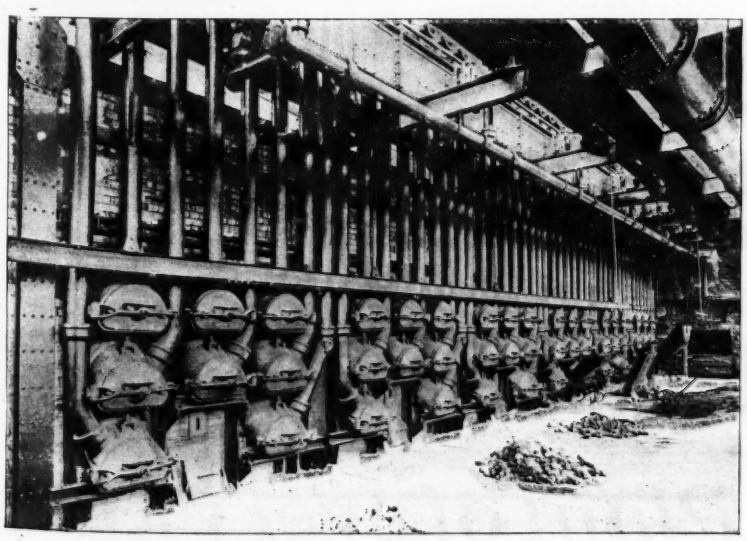

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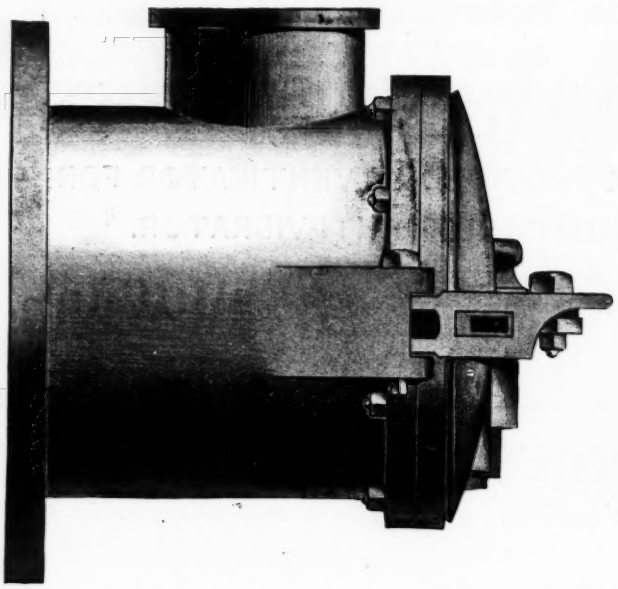

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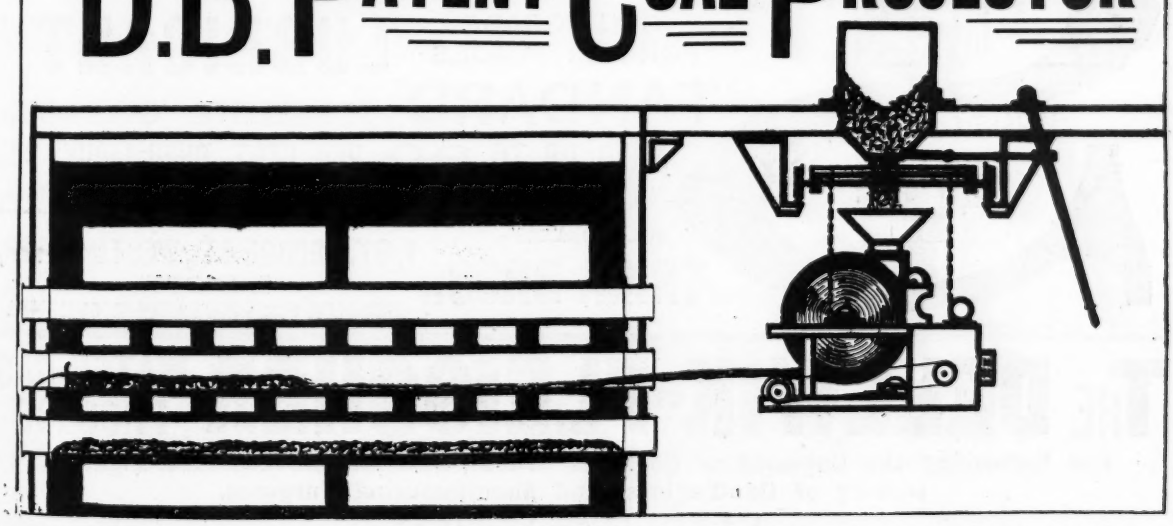

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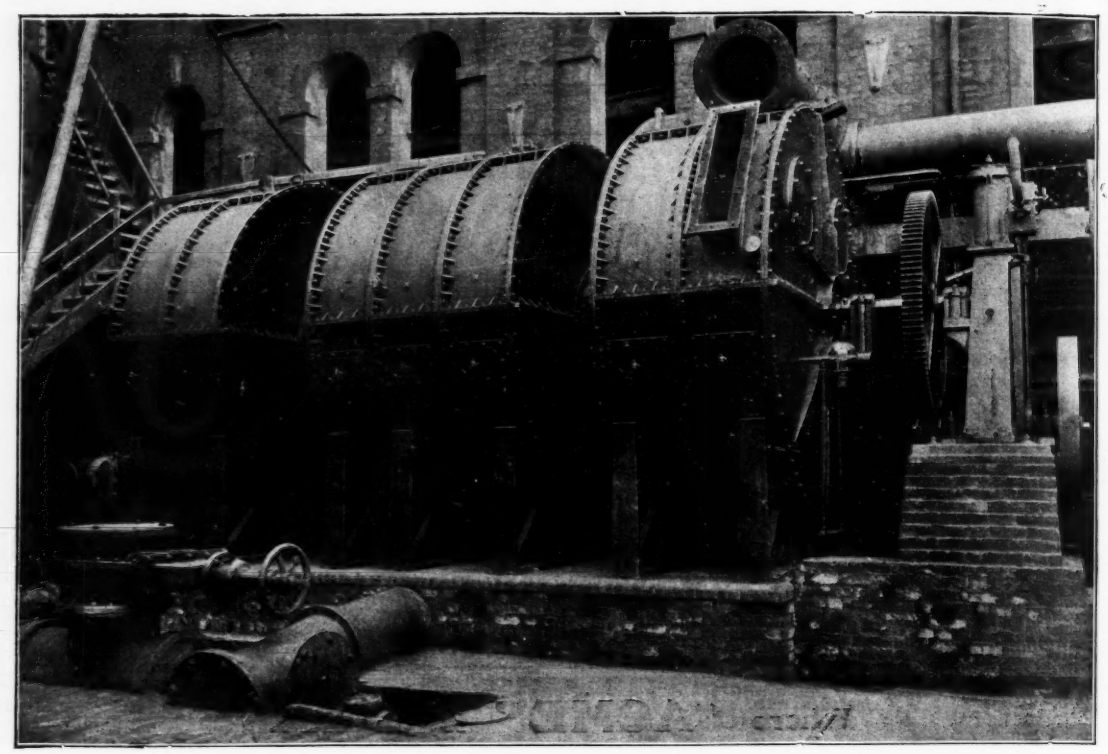

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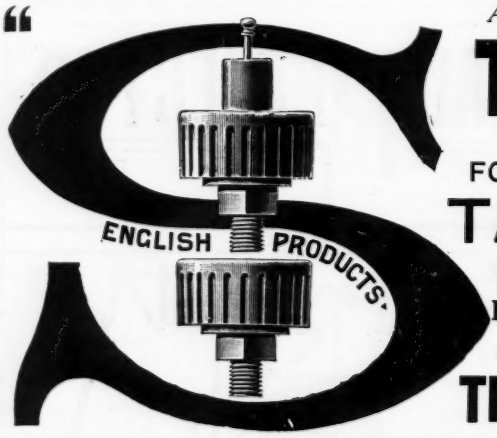

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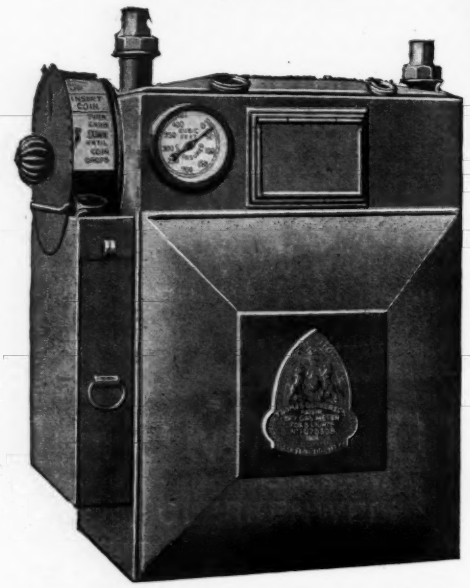

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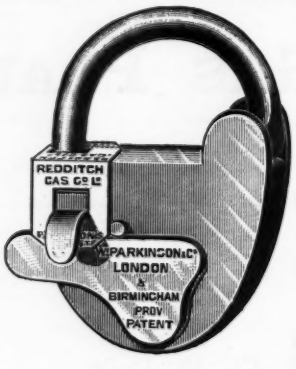

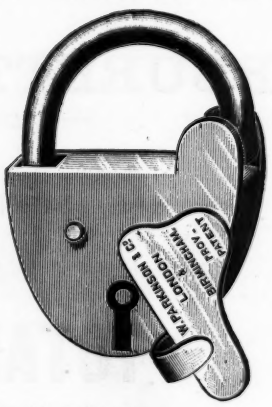

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JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

VOL. LXXXIV., No. 2113.—TUESDAY, NOVEMBER 10, 1903.

EDITORIAL NOTES.

The Procedure at Institution Meetings.

COMMENTING upon the procedure at meetings of the Institution of Electrical Engineers, now about to commence a new session, the "Electrical Review" has made some pertinent observations on the conduct of the business of such gatherings of professional men, which have their value for members of similar organizations. To begin with, our contemporary makes the important point that papers should be understood to be submitted to the Institution, not merely to the meeting. Recollection of this principle helps to indicate how papers ought to be treated. It is suggested that copies of them should be sent in advance to every member; and that the papers should not be read at length by the authors at the meetings. The author might with much advantage, in some cases, it is allowed, preface the discussion with a few introductory or explanatory remarks; but even this concession to the lazy ones who do not take the trouble to find out for themselves what the paper is about, is not willingly made. The paper, that is to say, is offered to the Institution, for inclusion in the printed reports, and is accepted on the authority of the Council. The true object of the meetings is discussion. This is the reason for bringing men together, at considerable expense and at much sacrifice of time. Many a member of a professional society has to spend two, or perhaps three, days to attend a meeting of a couple of hours—to say nothing of his travelling expenses, which are more than the annual subscription. In return for this, he receives by the conventional system the infliction of having to sit still for an hour, and listen to a bad reader, floundering through a mass of verbiage overlaying one or two points which can be perceived on the merest glance at the print of the paper. And perhaps, after all, the object of the meeting, which is to bring out the mind of the audience on the points raised, is not attained "for want of time."

The truth of the matter is, that the whole order of such proceedings is absurd, and the absurdity is frequently accentuated by mismanagement and selfishness or stupidity. Not one author of a paper in ten is able to read aloud properly, or even to do his composition the barest justice in this way. Our contemporary remarks this; and everyone who attends the meetings of technical societies must recognize the fact. Why, then, perpetuate the time-wasting tradition that papers must be "read?" This was the only way when it was not even usual to print papers. But in nearly all cases, nowadays, these are not only printed in advance, but copies are distributed in the room, in order that the reader may be followed from the text—a precaution very necessary to proper comprehension. Sometimes advance prints are sent to members before a meeting; but this privilege is not extended by all societies. Unquestionably, members should receive copies of papers in time for them to make suitable preparation for participating in the discussion, if they desire to do so; and the whole time of the meeting should be devoted to the discussion. There is perhaps in the minds of some a lingering notion that it detracts from the interest of a paper to have it printed in advance; but this objection applies more particularly, if it is valid at all, to the common practice of following the reader from the print, which has nothing to recommend it.

Further, there is often a sad display of unbusinesslike conduct in the discussion. As our contemporary again remarks, there is much "waste of time in butter." It should be left to the Chairman to express to the author the thanks of the members for his trouble in preparing the paper; and this tribute is due to an author irrespective of the merit of the paper itself. Speakers could then go straight to their points without mixing compliments with their criticism or their appreciation, as the case may be. Then, if it occurred to any member to classify the paper as a very good one, or creditable to the author, it would be known that he meant it. The following are words of wisdom: "It seems useless to "suggest, once more, that those who have nothing to say "should say it," and abstain from reminiscence. "Like "Mrs. Battle, we want 'the rigour of the game.'" In the same spirit, it is suggested that the Chairman should promptly suppress anybody who rises to say that he has "not had "time to read the paper, but would like to ask," &c. The bores are always with us; but it is too much to expect men to suffer them gladly every time they are minded to darken counsel and waste precious time by twaddle. On the whole, it appears that the bores and twaddlers would have less to encourage them if papers were invariably taken as read. As to the routine business, which takes up so much time at the beginning and end of technical congresses, considerable economy would result from putting all resolutions of a routine character into an *agenda*, and then move them by numbers. They read just the same in the printed reports; and this is the chief consideration.

Imperial Continental Gas Association—A Trial of Vertical Retorts.

ON his first appearance last Tuesday before the proprietors of the Imperial Continental Gas Association as the duly appointed Chairman of the distinguished executive who administer the affairs of this huge undertaking, Mr. John Horsley Palmer had nothing but a tale of steady, unchequered progress to relate; and if he never has anything better or worse to report, his position in the chair when before the proprietors will be a most comfortable one. Both he and Mr. Arthur Lucas, the new Deputy-Chairman, are to be felicitated upon their elevation to higher office at a period when the sky of the Association is so unclouded as it is to-day, and when, so far as it is humanly possible to see, everything is pointing to an uninterrupted period of prosperity. The proprietors were glad to learn that their late Chairman (Mr. T. H. Goodwin Newton) is able to continue to join in the deliberations of the Board, and will give his colleagues the benefit of his mature counsel, though feeling unequal to the burdens and claims of the chair, which he has, for several years now, filled with much dignity and honour both to himself and to the Association.

The gas sales of the past half year have been good, coke values have somewhat relapsed, but other bye-products have behaved well in contributing to the revenue; and the result has been that the profits reached to no less an amount than £199,697, as compared with £165,912 in the corresponding period of 1902. In their staple commodity, the Association have had an increased output, measured by that of the first half of 1902, of 4½ per cent. This figure, when placed in comparison with the augmentation in the number of lights (6·41 per cent.), and the increase of consumers over the twelve months (7·94 per cent.), gains in interest. Six months ago the corresponding figures were 7·04 per cent., 8 per cent., and 9·1 per cent. This continued greater percentage increase in the new custom as compared with the output is a very clear indication that one or more of three causes are operating against the latter having a *pari passu* rate of progression with the former. These causes are the constantly extending use of incandescent gas-burners, weather less conducive than formerly to gas consumption, and the prepayment meter system. But we have a notion that the incandescent burner has been and is playing a no mean part in producing this percentage difference between the quantity of gas distributed and the ever-expanding base of the Association as represented by the number of consumers. This is not at all a regrettable feature. So long as the new gas accounts opened in the books of the Association go on increasing as now, even if the consumption does not extend itself in the same proportion, there will be no ground (markets remaining even as friendly as at present) for anything but contentment.

Of very general interest were the remarks of the Chairman at the meeting on the subject of vertical retorts. Rumour has not allowed the fact to remain secret that the Engineers of the Association, or some of them, have been

occupying themselves assiduously in an attempt to perfect a system on this principle of carbonization; and Mr. Palmer now states that ere long there is to be—perhaps by the spring of next year—an installation at the Mariendorf station. The installation, it may be taken for granted, will embody the best of which our German friends, as the result of their experimenting, have knowledge in this particular line; and it will have to prove superior in practical working to anything that at present exists at Mariendorf (where the carbonization work is of a very high order), or at any of the other stations, to establish for itself a secure position there. Under Mr. William Drory's supervision, the installation will have a good test without, after it has got fairly to work, any undue favouring or pampering in order to make it realize excellence in results.

The vertical retorts with which Dr. Bueb's name is identified have been undergoing a long course of experiment at Dessau, but no information as to the results is yet forthcoming. Around these experiments is centred much curiosity; but patience must be exercised before more is learnt regarding them. Old as the idea of the vertical retort is, never before has it had such a thorough trial as it is now having, and will have to a still greater extent in the immediate future, both on the Continent and in this country. Gas-works contractors recognize this; and there has been not a little excitement in their ranks to obtain the option of acquiring rights in this or that system. This is a matter about which it cannot be long before we hear something from them direct. Meanwhile, it has been ascertained by those contractors who have taken the trouble to inquire, that there are no patents on this side of the water in connection with the American system of vertical retorts with which the names of Dieterich and Isbell are associated. In view of this, it is rather strange that someone has not had enterprise enough to put up a trial set, and see whether anything practical can be made of the American proposals in their latest form, instead of waiting for the results of what we hear is the somewhat similar form of plant (we do not suggest it is identical in all its features) that is now under trial and development at Dessau. The excellent results obtained with the Settle-Padfield system at Exeter (already published) continue to be confirmed. There is a great deal that is attractive in this subject; and the announcement upon it from the chair at the Imperial Continental meeting was not the least in importance among the points of the Chairman's address.

The Lesson of the Municipal Elections.

One of the financial journals remarks, with respect to the municipal elections of yesterday week, that "these are bad "times for ratepayers." The grounds for this reflection are the turnover of many of the Metropolitan Borough representations to Progressive majorities, and the considerable gains of the Independent Labour Party in different places all over the country. The fact as regards London is not difficult to explain, although the explanation is anything but a satisfactory one. As we observed last week, it has proved to be practically impossible to get Londoners to take much interest in their own local government. London is too big to have a single Municipal Corporation; and the experiment of carving it into a number of local government areas, with the style and form of boroughs, does not correspond with a real local patriotism. Men can lose themselves, and get lost, in London; and this is the opportunity of the small busybody who wishes for Metropolitan municipal "honours." There are some natural leaders of the people in the various London Local Authorities, from the ancient Corporation of the City down to the smallest Suburban District Council; but, as a rule, these bodies are manned by nobodies. It is very much so in the case of the London County Council, which is notoriously "bossed" by a group of fussy persons whose names London was astonished to see when they first got to the top of the Spring Gardens tree, and who have no other claim to distinction. For to Londoners one nonentity is as good as another, and is quite as likely to get into the Council.

The number of those who took the trouble to exercise the municipal franchise on the present occasion has not, so far as we are aware, been stated; but it is probably a small minority of the electorate. This is why the Progressives win. They are the forward set, who take the trouble to run the machine; and therefore it goes as they wish. Their nominal opponents are the Moderate men—a name that never commanded any enthusiasm yet, on tented field or at the polls. It is, naturally, the fanatics who win against the reputed sluggards. There is not much more in it. Though it was proclaimed beforehand that the municipal elections this year were to be run on political lines, this does not appear to have been generally the case. A good many successful candidates owed their election to their promises to working-class voters which they may find it difficult to perform. It always has been so; and this is probably as good a reason as any for the increase of the Labour party in local government. For when the working men discover themselves left by the common party man who has been placed in office by their votes—and this has often happened to them in the past—they naturally turn to the new organizations which offer them representatives of their own order. It is the existence of these organizations, and their efficient working, that make all the difference between municipal elections now and in the days before such things were. Of course, the workman's vote in local government affairs is a self-regarding one. He has plenty of warrant for this, in what he has seen of the part played in municipal life by his landlord and others, who, albeit unpaid, have not followed a public life altogether for nothing. Therefore the workman may call himself a Social Democrat or an Independent; but he most heartily approves of municipal trading and direct employment, which to him mean "soft jobs" for himself and his kind. His "independence" is largely Platonic, like Thomas Carlyle's love of silence. There is nothing very alarming in all this, so long as other orders of the community also do their duty in self-government; but if they run away from their proper positions, according to the state of life into which it has pleased God to call them, they must not complain that others take their places.

Trouble in the Belfast Gas Committee.

Hudibras has a pointed remark on the perils that "do "environ the man that meddles with cold iron;" but this risk is apparently exceeded in our time by the citizen who is rash enough to have a finger in municipal corporation gas coal contracts. Not many weeks have passed since we had occasion to comment unfavourably upon the tone of certain strictures passed by a colliery manager upon buyers of gas coals for municipal works. Apparently this worthy gentleman entertained a strong objection to the process of cheapening offers which goes on in some cases, almost as a matter of course, after the tenders are in. We thought he was rather hard upon municipal higglers over coal prices. But something that has just occurred in this regard at Belfast seems to give him more reason than it does to us; and therefore we hasten to make the "honourable amend." It was reported in the "Journal" on the 27th ult. that the Belfast Gas and Electricity Committee had accepted certain tenders for gas coal; and the next information concerning this transaction that came to hand was to the effect that the Committee had rescinded their resolution, and decided to advertise again.

On Monday of last week, an explanation of this curious affair was given to the Town Council by Mr. Andrews, the Chairman of the Gas Committee. He stated that, when looking over the tenders, he noticed that one firm wanted more than others for coal of about the same quality; and he thereupon asked the firm to reconsider their price. They did so, and took off 5d. per ton. When the Committee heard of this, they decided to call all the acceptances off and re-advertise. The Chairman took upon himself whatever blame might, in the judgment of the Council, attach to this proceeding, the object of which was to secure the coal as cheaply as possible in the public interest. Not unnaturally, a heated discussion followed this confession, in the course of which some rather injurious aspersions were bandied about. Certain members desired to have the whole affair investigated by the Local Government Board; but the Mayor refused to accept the motion, and eventually the subject dropped. Later, on another motion reflecting upon the conduct of the Committee respecting a different matter being adopted by the Council, the Chairman resigned. We do not pretend to have any judgment to pass on the personal aspects of this unfortunate affair; but on the question of principle involved there cannot be two opinions. There is no harm in higgling, so long as it is open and above-board, and all concerned are treated alike. If, however, as reported in this case of Belfast, one tendering firm were allowed to revise their price in order to

obtain a share of the business—however innocently this was done—it was not a fair thing to do. Probably Mr. Andrews himself now sees the matter in this light. His interference amounted to a piece of favouritism which the Committee could do no other than annul, as they did.

The whole story shows how necessary it is for those who undertake municipal work to be careful of their ways. Professed municipalizers need to be reminded that it is precisely such incidents as this that weigh with those who have little faith in the "principle" of municipal trading. It is quite unnecessary to raise any question of culpability in this connection. The ex-Chairman of the Belfast Corporation Gas and Electricity Committee doubtless acted, as he has said, according to his conception of his responsibility to the public. His good faith is not in question. When those who do not believe even in British or in Irish municipal gas supply, though this is a business that is popularly supposed to be so successfully conducted by local authorities that the whole case for municipal trading is frequently based upon the supposition—when those, we contend, who do not assent to the proposition are challenged for their reasons, they need not impugn the honesty of people who take part in local government. It is sufficient to point to the advantages for carrying on a business which the private trader wields, and which the municipal trader does not enjoy. Any chairman of a gas company might do with propriety all that Mr. Andrews admits he did; but circumstances alter cases. The Corporation administrators of a municipal estate may not treat it as if it were their own property, even in the best sense and with the best intentions. This is an integral factor in Municipalism which has to be allowed for. We may be permitted to express sincere regret that the usually placid course of Belfast gas affairs has been rudely troubled in the manner recounted, and to sympathize with the Chairman of the Gas Committee, whose arduous labours in the public service have come to this regrettable end.

A Banker on the Situation of Securities.

THE banker is the consultant physician of the body politic—a reflection that is irresistibly suggested by the address delivered by Mr. J. Herbert Tritton, the President of the Institute of Bankers, at a meeting of this body held at the London Institute last Wednesday. The recent shrinkage in the value of first-class securities, known to be largely held by bankers, ensured a hearing for Mr. Tritton when he set himself to expound the bank view of passing events. Why have British securities of the first rank fallen in value? For many reasons, according to Mr. Tritton, which the ordinary investor cannot be expected to know, still less to understand. The banker is better informed on some points. He knows, for instance, that a larger amount of stocks and shares than usual is still held on borrowed money. It is, of course, known pretty widely that the creation of these first-class securities has exceeded for the moment, and is likely to still further exceed, the power of absorption. Municipal borrowing, and in some cases municipal finance, are now rapidly becoming a byword; and Mr. Tritton cordially endorsed the suggestion that to one central authority should be assigned the duty of examining all proposals of municipal corporations and local authorities for expenditure upon capital account, the method in which the necessary funds should be raised, the sufficiency of depreciation and sinking funds proposed, and the term of repayment. The local government debt of Great Britain is now estimated to stand at some 350 millions sterling.

It is only natural, in a way, that those who are uneasy in face of certain conditions and tendencies of English finance should ask why the American Money Market is subject to such immense and far-reaching disturbances. Many people will be more or less satisfied with the convenient explanation, with which certain newspapers have not been slow to supply their readers, that it is the "trust system" which is at the bottom of the trouble. And as from the trusts to the system of industrial protection favoured in America is but a step, those who are induced to take it will probably flatter themselves that they have penetrated to the source of the financial earthquakes which visit the United States from time to time. It seems almost a pity to throw any doubt upon so very plausible an explanation; but regard for truth compels the careful observer of the world's ways to examine particularly every cut-and-dried account of the cause of what he sees going on around him. Off-hand explanations, such as "jump to the eyes," are not for him. Trusts may come and go, tariffs may be raised with questionable intentions by a time-serving administration. But the spirit of the nation remains without change, or changes slowly; and this has more to do with such phenomena as New York has lately presented, than any detail of financial or of fiscal arrangements. Speculation in the United States was ever feverish, and was always on as large a scale as could be contrived. Investments were always very lightly held, so that an Addicks could obtain the control (say) of the Boston gas undertakings for his own purposes before anybody outside knew what was in the wind. Why could not the same tactics be used in England? It is not so easy to answer this question conclusively with reference solely to matters of form. English gas stocks are to be had for the buying, like the American; but it is not considered to be worth anybody's while to engineer "deals" in such property after the American model. The same remark applies to English railways, iron-works, and shipbuilding yards. The truth of the matter rather seems to lie in the difference between American and British ideas of the nature of business enterprise. Take any popular account of what an American calls business, and it describes attempts to make "corners," to pull off "deals," and generally relates to the gambling side of stock trafficking. England gambles too, and supports a swollen Stock Exchange of parasites on industry, transportation, and commerce; but the national idea of "work" is not yet that of bargaining for the rise or the fall in other people's property. It may come to this in time, perhaps; and when it does, British finance will be as the American, so that no prominent business man will ever know whether he will wake in the morning a multi-millionaire or a bankrupt.

Profit-Sharing Making Little Headway.

When one considers the remarkable results of profit-sharing or co-partnery in the South Metropolitan and Crystal Palace Gas Companies, the figures referring to the general subject which have recently been published by the Labour Department of the Board of Trade are somewhat disturbing. The success of the two Companies mentioned affords undeniable proof of the capability of the system to do all that Sir George Livesey says it can accomplish. Then what is the reason that the system applied in other directions in the industrial world is receding (according to the returns) in its application? We cannot account for it; but there is no doubt that, in causing such schemes to answer their several purposes, there is a great deal first in how the foundation of the scheme is laid, and, secondly, in how the subsequent erection is officially supervised. The personal factor has far more to do with the success of such schemes than is generally acknowledged; and personal influence, it is observed, has to be exercised pretty freely during the first years of an innovation of this kind in a business, or the whole thing will fall like a house of cards. Now according to the returns referred to, there were 74 firms practising profit-sharing in July, 1902; but in the succeeding twelve months six firms put an end to it, while there was only one new recruit. Of the 69 profit-sharing concerns at June 30 last, 65 were in the United Kingdom and 4 in the Colonies—the former employing a total number of workpeople varying between 41,902 and 44,240, and the latter between 960 and 970. Further information is available regarding 59 of the firms or companies included in the foregoing figures. Among other points, it is shown that a mean bonus of 5·1 per cent. was distributed on the wages paid in 1902, as against 5 per cent. in 1901 in 58 cases. But there were 15 instances in which no bonus was earned in 1902; so that, in the remaining 44 cases, the mean bonus worked out to 7·4 per cent., which was 1·2 per cent. better than in 1901. This is a very satisfactory feature of the returns. The losses in the ranks of profit-sharing undertakings is certainly to be deplored.

An Urban District Council's Ambition.

Those of our readers who carefully follow the Committee proceedings on Private Bills will remember that in the last session of Parliament an Act was secured by the Rickmansworth Urban District Council which enables them to purchase the undertaking of the local Gas Company. This, of course, is a common enough proceeding; and the concern in question, like most similar undertakings, is in such a sound financial position as to make it, under ordinary circumstances, a very desirable acquisition. There is,

however (as will be seen from an article published in another part of to-day's issue), at least one point in the case of Rickmansworth which suggests that the Council should act with the greatest caution in the matter. The rateable value of the place is small —less than £24,000—and an expenditure of over £30,000 has just been incurred on a sewerage scheme. With a debt like this hanging over the heads of the ratepayers, one would have thought the councillors would have come to the conclusion that, for awhile at all events, they had done enough. By the time the purchase of the gas-works is completed, and due provision is made for the necessary extensions, the total debt will in all probability amount to something approaching three times the rateable value of the town. The sewerage scheme is what is termed an unremunerative undertaking; and should there prove to be a deficiency to be made good each year on the operations of the gas-works, owing to the profits not being large enough to meet sinking fund and interest charges, the position would be a disastrous one. Indeed, Lord Ebury, when the Purchase Bill was before the Committee of the House of Lords, said that he, together with a good many other influential inhabitants of the locality, did not think the ratepayers ought to run the risk of loss; and we have heard it pretty broadly hinted in the district that the majority of those who attended the public meeting at which the Council were authorized to proceed with the scheme were only weekly tenants, who had no direct interest in the matter at all—most of them not even being gas consumers. And if local rumour is to be believed, the absence of direct pecuniary interest on the part of those advocating the proposal is not by any means confined to the participators at the public meeting; for it is said that there are also two members of the Council who do not personally pay rent, rates, or taxes. The considerations mentioned here, and set out more fully elsewhere, seem to us to place the agitation at Rickmansworth a little outside the ordinary run of gas-works purchase questions.

The Duties of Councillors

Some remarks which are particularly appropriate at the present time, just when the municipal elections have been held throughout the country, are to be found in a leading article in the current number of "Engineering." It is pointed out that the responsibilities of those who offer to represent the ratepayers and protect their interests in matters of local government are great, and ought not to be lightly accepted; but when they have been accepted, they must be—or ought to be—fulfilled with no regard for self-interest, but with a single-minded desire to promote the welfare of the whole community, and to ensure that its affairs shall be conducted on a sound business footing. No one will deny the assertion of our contemporary that there are many members of local councils who do endeavour to the best of their ability to follow this ideal (and frequently, we would add, with a very considerable amount of success); but it is unfortunately equally impossible to disagree with the assertion that there are others who do not do so, and that there is a third class between the two, consisting of men who walk honestly enough according to their lights, but are not qualified, either by education or training, to take a broad, intelligent view of the business management of the great trading concerns which now form the special feature of municipal enterprise. There is some excuse for members of the two last-named classes succeeding in getting elected once; but if they do so a second time, after their want of will or capacity has made itself manifest, ratepayers have only themselves to blame.

And Ratepayers.

As "Engineering" remarks, whatever may be the characteristics of the majority of the members of the council, it is still the duty of the ratepayers themselves to try to understand the details of their local schemes, and to keep a watchful eye upon the actions and methods of their representatives. And this will become more and more necessary as the field of municipal enterprise is widened. But, alas, however necessary it may become, it seems almost too much to hope that the majority of the ratepayers will ever be induced to take an appreciable amount of interest in the doings of their local governing bodies. They will not even shake off their apathy on election day; but this is possibly because it appears to them that, whoever is returned, the result is always the same—the rates continue to rise. There is admittedly a far greater scarcity than need be of first-rate business men on certain of the councils; and many of the witnesses who recently gave evidence before the Parliamentary Committee on Municipal Trading ascribed this deplorable fact to the fear of surcharges being made at the audit of the accounts. A much more probable explanation, however, appears to us to be the remarkable lack of interest exhibited on almost all sides in municipal affairs. The honour attaching to this class of public work would be very much more appreciated if the contests for election were keener, and the successful candidates could really feel that they represented the majority of the ratepayers. These reflections naturally bring us to what is perhaps (after the fear that it may eventually lead to the virtual bribery of large numbers of the electors, through their employment by the councils) the greatest danger attached to municipal trading—namely, that, although at present sufficient men possessing the necessary ability to manage the commercial undertakings involved may be found willing to offer their services, the attitude of the ratepayers affords no guarantee whatever that in course of time the councils may not become composed entirely of persons absolutely incapable of doing the work that should reasonably be expected of them.

Burden of the Rates at Southampton.

It was a most encouraging state of affairs that fell to the lot of the Directors of the Southampton Gas Company to lay before the shareholders at the half-yearly meeting last week. A very substantial increase in the quantity of gas sold, and at the same time a large decrease in the cost of coal and oil (notwithstanding the bigger output), make good reading for the proprietors. One item in the report, however, was less satisfactory, as indicating to what an extent gas companies are affected by the continually growing amounts that are levied for rates and taxes. It was pointed out that in Southampton the Company's share of this burden, for the year ended June last, worked out to nearly 2¼d. per 1000 cubic feet of gas sold. While, of course, it is perfectly correct to say that this sum has to be paid by the consumers, it must not be forgotten that it results in the price of gas being about 2¼d. per 1000 cubic feet higher than would otherwise be the case. Were the charge this much lower, the consumption would without doubt be substantially greater than the Directors have even now the pleasure to report. Though, therefore, the amount admittedly comes out of the consumers' pockets, the Company are nevertheless prejudicially affected to a very appreciable extent; and hence those who are striving to further the progress of gas undertakings have a very well-defined interest in the general work of their local governing bodies. This consideration alone is amply sufficient to justify the policy of the "Journal" in so frequently drawing attention to municipal performances which appear to adversely affect the interests of the general body of ratepayers. The case from Llanelly, which is dealt with in another portion of to-day's issue, when viewed in this light, is one that should be carefully studied by readers, though it does not refer directly to either gas or water supply.

Reviving a Faded Memory.

A London firm of coal merchants have just issued an advertisement circular which might have been considered clever some thirty or forty years ago; to-day it is at least all those years out of date. The advertisement is for a coal that is, of course, the perfection of what a coal should be. All the evil attributes of other kinds of coal for domestic purposes are entirely absent in this particular one. It has been dubbed "Crown Cookers." There is a firm in London who have long been supplying a gas range known as the "Crown" cooker; and probably the popular gas cooker suggested the name for this wonderfully virtuous coal. We are not going to advertise the name of the firm who have issued this foolish advertisement; so readers will save themselves trouble by not inquiring for it. But there is no harm in letting them enjoy the amusement of reading the opening lines of the circular, which carries the memory back to the 'seventies and early 'eighties. "Ask your doctor," it reads, "whether gas-fires are as healthy as those made by coal. Also whether meat cooked in an oven in which gas is burning is as wholesome as that roasted or baked in an oven in which there are no fumes. Also whether it is as digestible if cooked in a gas-stove. Also whether a coal fire does not ventilate the room and keep the air pure and sweet." We have no hesitation in answering in the affirmative the first

three questions, and replying to the last that gas-fires properly fitted will do precisely what a coal fire will do in the matter of ventilation, without the distress occasioned by the dust and ashes produced by the latter. "Ask your doctor!" The trouble would be to find a doctor now who does not have the cooking and heating in his own house done by means of the convenient and cleanly gas supply; and the coal firm of antiquated notions would have equal difficulty in discovering a doctor who would dare to say that there has been any increase in the rate of mortality in consequence of the tremendous spread of the most scientific system of doing these things that is known to-day. The wail of the London chimney sweep is surely not going to be taken up now by those in the retail coal trade of London. It had not occurred to us until this circular came to hand that they might be feeling the pinch of gas competition as well as the chimney sweep.

A Deceptive Title.

Writing in the "Engineering Magazine," Mr. A. Humboldt Sexton supplies an article which hardly complies with the title chosen of "Recent Developments in the Production of Water Gas." A title that would have been more in consonance with the subject-matter would have been that of "The Dellwik-Fleischer Water-Gas Process;" and moreover we disagree altogether with him in describing the systems to which he refers as "recent developments." Let us see. First of all he tells his readers what water gas is. Well, there is nothing exactly "recent" to be found there. Then the history of water gas succeeds; and is disposed of in a little more than a printed page, which is a feat worthy of a conjurer. The author commences his history with Lowe, incidentally refers to Loomis and Pettibone, and winds up by alluding to Dellwik and Fleischer. We must really object to the "history of water gas" being treated with such scant courtesy, or to anyone pretending that he can fairly deal with it in such a way. The whole of the remainder of the article is taken up with a description and account of the performances of the Dellwik-Fleischer plant; but again, we cannot find here the justification for the "recent developments" title. Mr. Humboldt Sexton has dipped pretty freely into Mr. Dellwik's paper of 1900 before the Iron and Steel Institute, repeats the results of some experiments of Professor Lewes which Mr. Dellwik also quoted, and has extracted from previous publications of this year the Tipton figures. The title of the article raised our interest; what follows the title is extremely disappointing. We were led by the heading to expect something new; but the "recent developments" prove to be simply old friends. On the first page, Mr. Sexton, referring to the Dellwik-Fleischer plant, says: "Received at first with a considerable amount of incredulity, largely due to its very simplicity, the process was soon found to be a success not only on the experimental scale, but on the larger scale of practical application; and this is the real test of the value of any invention." On the last page he says: "On the whole, the process of Messrs. Dellwik and Fleischer has a great future. It seems to be the greatest advance in the production of fuel gas that has been made since the introduction of producer gas; and it well merits the attention of all users of fuel gas." This may be all very true; but it does not dispose of the fact that in the article there is little that justifies the title.

"Agricultural Value of Gas Lime."—In response to several requests, reprints in leaflet form have been prepared of the paper on the "Uses of Gas Lime for Agricultural and Horticultural Purposes," read last month by Mr. Charles D. Phillips, J.P., before the Monmouthshire Chamber of Agriculture. An announcement on the subject will be found in our advertisement columns.

Politics in Municipal Work.—By a great majority, Mr. Gilbert Little has been returned as a member of the Smethwick Corporation; and we add our congratulations to him on the confidence shown in him by the electors. In returning his thanks to the latter, he says he is of opinion that his majority would have been even larger if a few "citizens" had not unwisely introduced party politics into local affairs. His resolve will be applauded, that "should the majority of the people of Smethwick ever descend to making political questions the pass for candidates to the position of councillors, on that day there will be a seat vacant"—the one to which the electors of Victoria Ward have just returned him. It would be a good thing for many of our large cities if the representatives of the people on the local governing bodies had the courage of the new councillor of Smethwick.

WATER AFFAIRS.

The Metropolitan Water-Works Arbitration.

The Court of Arbitration constituted under the Metropolis Water Act, 1902, completed a full week's work on Saturday—sitting on that day instead of Wednesday. Practically the whole of the five days were occupied with the Water Board's case in opposition to the East London Water Company's claim, which, it will doubtless be remembered, was opened by Mr. Fletcher Moulton on the previous Friday. Before he resumed on Monday, however, the attention of the Court was directed to three matters having a very material bearing upon the arbitration, apart from the case now under consideration. At the opening of the sitting, Mr. Balfour Browne complained that comments on the proceedings had appeared in a certain newspaper; and he asked the Court to direct that this should not be done, as it might prejudicially affect his clients. The President said the Arbitrators were unanimously of opinion that such comments were decidedly improper. We do not believe for one moment that they would have had the slightest effect upon the Court, even supposing they had been seen. At the same time, the action of the learned Counsel was quite justifiable; and we are pleased that it elicited such a definite pronouncement by Sir Edward Fry. The case is, to all intents and purposes, before a judicial tribunal, and therefore it should no more be critically commented upon than if it were being tried in the Law Courts. A fair record of the proceedings is allowable, as Mr. Balfour Browne fully acknowledged, but nothing more.

This matter having been disposed of, it was arranged that the Counsel for the various Companies should address the Court on the legal aspect of their respective cases as affected by the sinking fund of the City Chamberlain and what is generally known as the "sterilization" clause. The subject was opened on behalf of the Chelsea Company by Sir Edward Clarke, who argued that the fund was of advantage to the owners of the property, and therefore ought to be taken into account in assessing the amount to be paid to them for it by the Board, who would come into possession of the undertaking relieved of the necessity for providing a sinking fund. Counsel representing the other Companies having addressed the Court, Mr. Moulton was not called upon to reply in support of the Board's contention that the property should be transferred subject to the payments to the fund. The President pronounced the unanimous decision of the Court that the Board were right; and he added that they were prepared to act upon this principle. With regard to the sterilization clause, they were of opinion that if the possession of statutory power, even though it were unexercised, had strengthened the position, and consequently increased the stability of the income, of a Company, it must be considered as an "advantage" within the meaning of the section, and was accordingly a ground for abatement. But whether the mere possession of power to borrow was such an advantage, was a point on which they did not express any opinion.

After these important decisions, Mr. Moulton proceeded with the opening of the Water Board's case against the East London Company. He was, however, relieved to a considerable extent by an intimation from the President that he and his colleagues, as at present informed, thought they should take an average of years rather than base their award upon the accounts of the Company for the single year 1902. The learned Counsel accordingly passed on to deal with the quality of the Company's supply; and he condemned the River Lea as being a source which could not be looked to in the future for furnishing good and wholesome water. The first witness called was Sir Alexander Binnie, who not only supported Counsel's condemnation of the Lea, but said, with regard to the Thames, that water taken from a navigable river must always be subjected to a very expensive process of filtration before being supplied. As to quantity, of the entire 36 million gallons per day available, 10 millions, or 26 per cent., last year came from sources which could not be relied upon as permanent. He thought 30 gallons per head of the population was the average daily requirement. This figure was supported by Mr. George F. Deacon, who followed, and who also objected to the Lea, the water from which he characterized as "most unsatis-" factory." This arose, he said, from excessive pollution

of the source, and not from the Company's works, which were probably the best of them all. Mr. Brough Taylor, a civil and consulting engineer, joined in the general condemnation of the Lea. The examination of witness on this point drew from the President a remark that the question for the Arbitrators was not whether the river water, but that which was delivered to the consumers, was absolutely pure. Mr. Freeman said the contention of the Board was that the water could not be permanently relied upon, even after its filtration. Mr. Joseph Parry, of Liverpool, and Mr. James Watson, of Bradford, followed on much the same lines. Sir John Evans, the Chairman of the Hertfordshire County Council, spoke to the decrease in the volume of the Lea in recent years, and acknowledged that the Council had not been successful in keeping out pollution. Other evidence having been given as to the condition of the river, Mr. E. B. Barnard, a member of the Water Board and of the Lea Conservancy Board, was called, and described the portion of the river from which the Company take their water as being at present totally unfit for supply. At the same time, he said he was not prepared to advise the Water Board to abandon it. Dr. Klein was the next witness, and he gave the Court the results of a number of bacterioscopic examinations of the Company's water, showing that, even after filtration, it contained living organisms characteristic of sewage origin. He acknowledged, however, that no epidemic had occurred in consequence of the supply of such water, although no one knew what harm might have resulted in individual cases.

On Friday, the first witness called was Mr. Urban Smith, whose evidence bore upon the quantity rather than the quality of the Company's supply. He said the material point for the consideration of the Court was whether the New River and East London Companies could continue to abstract from the Lea Valley the amount of water now being taken. Personally, he thought the resources of the latter Company were overtaxed. Pumping from their wells could not be maintained to the present extent; while the River Lea was falling at a very rapid rate. He admitted, in answer to a question by the President, that all the rivers throughout the country are declining. Professor Dickson followed with evidence as to the rainfall in the watershed of the Lea, and agreed with the previous witness that rivers generally in England are flowing less abundantly than of old. The next important witness was Dr. Thresh, the Medical Officer of Health to the Essex County Council. He stated that the Lea could not be considered a satisfactory source of supply, and that any attempt made to radically improve it would necessitate an enormous outlay, and seriously curtail the quantity of water which could be abstracted. He added that without more water the development of the county would be greatly impeded. Other witnesses were called—including Dr. Macfadyen, the Principal of the Bacteriological Department of the Lister Institute of Preventive Medicine, to confirm the evidence of Dr. Klein.

On Saturday, Mr. W. Plender, a member of the firm of Messrs. Deloitte, Dever, Griffiths, and Co., who was under examination when the Board adjourned on the previous afternoon, and who had put in a statement as to the results of the past ten years' working of the Company, was cross-examined upon it, and, in reply to the President, expressed the opinion that, instead of adjusting the income for 1902 as proposed, an average of ten years would dispense with adjustments, and serve as a satisfactory basis for settlement. Mr. H. E. Haward, the Comptroller to the London County Council, followed, and told the Court that, instead of taking the average for the last ten years, he would start with 1902, and consider whether, having regard to the experience of those years, the income was likely to be maintained. He showed by tables put in that there had been an increase in the Company's gross water-rental; but, on the other hand, the percentage of working expenses thereto had gone up, and would, in his opinion, continue to do so, with a corresponding decrease in the profits. Mr. H. L. Cripps, the Board's Parliamentary Adviser, gave evidence with regard to the issues of stock. At the request of the President, Professor Dewar was called on the question of the quality of the supply, and expressed his general agreement with the evidence given by Sir William Crookes.

British Association of Water-Works Engineers.—The eighth annual winter meeting of the Association will be held in the apartments of the Geological Society, Burlington House, on Dec. 12. The programme is not yet ready for issue; but the Secretary (Mr. Percy Griffith) asks members to note the date.

ESSAYS AND REVIEWS.

CHEAPENING THE INSTALLATION OF THE SLOT SYSTEM IN LONDON.

It recently came to be known that the Gaslight and Coke Company had adopted a new cooking-stove for slot-meter installations, or rather a gas-stove specially adapted for the purpose. This in itself does not seem a matter of much import; but when the information was accompanied by the statement that the stove was a good one, and very cheap in view of its quality, the subject was immediately invested with greater interest, as it suggested the possibility, in connection with the activity in gas business development that is now frequently brought to the notice of the inhabitants north of the Thames, of something being done to still further reduce what was regarded by most gas engineers, only some three years since, as the very extravagant charge incurred by the Company for the installation of the slot-meter system.

Looking up some notes bearing on the subject, there is found to be a great divergence in the country in the average expenditure per slot installation. The figures run anywhere between £3 and £6; and it would be of great interest to know why there should be such differences. The explanation no doubt is due to the variation in the quality and extent of the fittings that are put in; whether gas stoves, grillers, or boiling-rings are included; and there may be one or two other contributory reasons. However, at the time of the sittings of the Powers of Charge Committee, it was laid against the Gaslight and Coke Company that they held about the top place in the country for lavish expenditure per consumer on the slot meter system. Averages of £9 and £8 13s. 8d. were spoken of, as against (then) about £6 in the case of the South Metropolitan Gas Company, exclusive of the service-pipe running from the Company's mains to the house. Sir George (then Mr.) Livesey mentioned the Gaslight Company's average as being a little under £9; but he explained that in their case, a 5-light meter was put in, while only a 3-light one was fixed under ordinary circumstances in the South Metropolitan Company's district. But even taking this into account, he regarded the expenditure per slot consumer of their neighbours as extravagant and uncalled for. There appears to have been some justification for this, inasmuch as other companies—and much smaller ones—were pushing the system at a lower average rate of capital expenditure; while from the very greatness of the Gaslight and Coke Company and the extent of their business, it might have been imagined that the work could have been done for a smaller amount than in the case of companies whose purchases for this branch of their business were of a less important character. But it was not so. According to "Field's Analysis" for last year, the number of slot consumers on the Company's books was 136,507. Calculate out all the extra expenditure on this number of consumers, and the excess alone will amount to quite a respectable capital. It was only in 1899 that Mr. Field was found arguing that for the average of £8 13s. 8d. which the Company spent per slot installation, they obtained "full value." He agreed that they gave fittings of a more elaborate style than was usual—a larger meter, a better stove, and better fittings, and iron barrel instead of compo. pipes. But he did not justify this luxuriousness beyond the before-mentioned commonplace remark that the Company had "full value for their money," which remark failed to carry conviction, both outside and inside the committee room, that such an enormous expenditure per installation as his Company were then incurring was sensible or justified.

Events have proved that it was neither the one nor the other, for a very considerable reduction has since, quietly and unostentatiously, been made in the expenditure; and, if we read present signs rightly, and intelligence serves us true, economies have been made which will bring within the hands of the Company a further saving of several shillings on each installation. This will mean on their extensive business—assuming the rate of increase in this direction to be at such a figure as may be fairly expected—several thousands of pounds in the year. The first steps in retrenchment in the slot capital expenditure may be taken as a direct result of the inquiry of 1899; but the more recent economies effected must, there can we think be no question, be attributed to the fresh conceptions introduced into the department by late changes. There is no personal reflection intended here; it is merely an issue, of frequent occurrence in the commercial walks of life, following a new grafting and the bestowal of larger responsibility. We have not the figures for publication as to the decreases that have been made in the slot capital expenditure per installation since those days of nearly £9 in 1899. We wish we had, as it is believed they would show, to the credit of the Company, that the officials have (with the latest economies that, it is understood, have been made in the contracts entered into) brought down the average of the capital expenditure to a point that will vie with almost any other gas undertaking—especially if account is taken of the excellent quality of the fittings and the materials used. We should not be surprised to hear that the total cost (including cooker) now averages a trifle under £6 per installation.

It was in connection with the slot cooking-stove that our attention has been redirected to this subject; and in regard to it we are able to speak a little more definitely. In the stove alone, the Company have effected contracts at several shillings reduction on the former price, and yet are able to give the slot consumers a stove that affords more conveniences than the old form. In this way, economy has been accompanied by, in certain respects, improvement. It is believed that we shall not be far wrong in stating that formerly the Company had at least half-a-dozen different contractors for slot cooking-stoves; and consequently there were as many different patterns. This, from the point of view of maintenance, is not economical; but now one standard pattern has been adopted. What this means—with all parts interchangeable, and no necessity to keep more than one stock of different parts instead of several types of parts—in such an extensive slot business as that of the Gaslight and Coke Company cannot be stated in £ *s. d.*, but it will certainly hereafter represent a very tangible saving in expenditure. Of course, the standardization of the slot cooker is not a new idea; and the Gaslight Company have been preceded in this respect by certain other companies. However, the stove which formed the base of their own particular standard was the Wright and Butler Manufacturing Company's "Forward" pattern; and this has been adapted in certain parts to meet the Company's requirements. With these improvements, the stove is the standard of all future slot stoves of the Gaslight and Coke Company. This important matter having been settled, tenders were called for, and contracts let for the supply of the stoves; and among the successful tenderers, we understand, were the Cannon Iron Foundries, the Richmond Gas Stove and Meter Company, and Messrs. R. & A. Main, Limited. They will all supply the same stove and at the same price, which, as previously stated, is said to be several shillings below old contracts. It would not be fair to mention the exact figure, as, of course, some consideration had to be given by the makers to the fact that the contract is a large one. Notwithstanding that they have adopted a standard pattern, it is prudent of the Company to have split the contract among several firms, as it has the effect of ensuring future supplies.

These are some of the gains of the Company in adopting a standard slot stove; and the consumers also gain advantages. Instead of only two boiling-rings and a 12-inch oven, they will now get in the standard pattern two boiling-rings, a griller, and a 14-inch oven. The stove is to be called "The Horseferry." It is strong in design, and in addition to the points already mentioned, it has a stout top heat-deflecting plate inside the oven, with a corrugated under surface. The sides and door, however, are not packed. This is a general description of the standard stove to which the contractors are to work.

Unless the Company will supply us with some information as to their costs (and it would, of course, be interesting if they would do so later on), this is all the information we have to furnish on the important move of theirs in retrenchment without, to the best of our knowledge, affecting efficiency. The slot-meter business is one of tremendous moment to the Company. In it is to be found one of the largest sources of future increases of business; and the lightening that has been effected in the cost of providing for the extensions of the system must tend, and largely so, to its stimulation in the district. No one, we venture to assert, will be better pleased than the critics of past administration if the present zeal in this direction contributes, as it is bound to do in the future, to the turning of those small percentage relapses in gas consumption into percentage gains half year by half year. But it must not be forgotten that, after the planting of the seed, time passes before the harvest is reached.

THE COAL AND OIL TRADE OF THE WORLD.

The annual "Coal Tables" issued by the Board of Trade have just appeared; and it can be readily believed that never at any time since these statistics were first published have they commanded so much notice as at present—for a sufficiently obvious reason. It would be impossible to exaggerate the importance of coal to the country; and these striking tables serve better than any other presentment of the facts to illustrate the bearings of this observation. Of course, in a general and rather vague way, all English people are aware of the commanding part played by the coal capital of the country in sustaining its manufacturing industries and its foreign trade; but few persons could, if the question were abruptly put to them, indicate where exact and detailed particulars of the world's coal trade might be ascertained. This is the office of the present tables, which also convey information concerning the trade in what might be termed coal products and substitutes, such as coke, lignite, and petroleum.

As might be readily supposed, the usual annual statistical return has been supplemented this year by various specially instructive appendices. As regards the total production of coal in the five principal coal-producing countries in the world since 1900 inclusive, it is stated that the output of the United Kingdom has varied but little from about 227 million tons. For a variety of reasons, some of which will immediately occur to readers' minds, the demand for British coal has not increased much of late years. It is true that 1902 was the maximum recorded; but the quantity was less than the comparative trifle of 2 million tons in excess of 1900. On the contrary, the United States production rose from 240¾ million tons in 1900 to more than 268⅓ million tons in 1902. Germany and France produced actually less over the same period; and Belgium just held its own. The German output is less than half, and that of Belgium and France together less than a quarter of the British production. Clearly, if the coal requirements of all civilized people were equal, certain countries would have to obtain a large quantity of coal from somewhere to make up the native deficiency. This condition of equality, however, is very far from prevailing.

We recently had occasion, when disputing a certain aspersion on the character of gas coal buying, to point out that the last season's fall in the prices at which the requirements of British gas undertakings were obtainable was largely due to the circumstance of a smaller demand falling upon an overmanned industry. It is probably a debatable question whether the collieries of the United Kingdom are really overstocked with labour; but when we offered this reflection on the subject, we had no recent statistics of colliery employment. Now that this want is supplied by the present tables, the case as then put appears stronger than was suspected. No fewer than 17,400 additional workpeople found employment in and about British collieries in 1902, as compared with the previous twelve months. The year before, the growth was 27,800; and the year before that 51,200. In the four years only, from 1899 to 1902 inclusive, close on 100,000 persons were added to the pay-sheets of the collieries of the United Kingdom. One may well ask the reason for this enormous increase of the collier population. For the same period, the output of coal increased only by 7 million tons—from 220,095,000 to 227,095,000 tons. That is to say, while the increased output was after the rate of about 3 per cent., the number of persons employed in getting it increased by nearly 15 per cent. If this effect is not chargeable to Trade Unionism, it is at least a remarkable coincidence that the period of time covered by the figures is marked by the rise to a position of supremacy of the Miners' Federation. The sole reason for the existence of the Federation being the improvement of the rate of miners' wages and the increase of their earnings, it is open to be asked how this object is to be attained if the calling is allowed to be overcrowded—especially with inefficient workers. This is a matter that presses for attention both by colliery managers and by Trade Union leaders. The fact as revealed is a striking corroboration of the argument that Trade Unions, as actually managed, are no real protection to the callings so organized.

The extent of the lignite production of some European countries is a surprise to those who have not paid much attention to the industry, one of the disadvantages of which is that the material will not make illuminating gas. Germany produces 43 million tons of this so-called brown coal, which is only worth 2s. 4½d. per ton. Austria comes next, with an output of upwards of 22 millions, worth 4s. 1½d. per ton. French lignite, of which only 623,000 tons were produced in 1902, must either be of superior quality or it is very dear at 9s. per ton.

The final part of the return deals with petroleum production. During the twenty years from 1883 to 1902, the production of raw naphtha in Russia increased more than tenfold. Meanwhile, the exports grew in very much greater proportion; having risen in the same period from 15¼ to 388 million imperial gallons. During the same time, the exports of American mineral oils rose from 504 to about 1000 million gallons. The mineral oil production of the rest of the world does not amount to the Russian figure. British India produces 50 million gallons, which is a substantial increase on previous years; and Java, together with Sumatra, about the same. The petroleum output of Austria is considerable, being upwards of 100 million gallons.

DEPRECIATION OF MUNICIPAL ELECTRICITY SUPPLY PLANTS.

The Chairman of the Finance Committee of the Bolton Corporation—Mr. Frederick Walmsley, F.S.A.A.—holds views respecting the necessity of making provision for the depreciation of municipal undertakings which, as lately stated in the "Journal" (*ante*, p. 148), he has laid before the Conference of Incorporated Accountants.

It is Mr. Walmsley's opinion, according to this paper, that the depreciation allowance in question should not be taken out of the sinking fund. It is therefore somewhat startling to discover that the Electric Lighting Committee of the Borough of Bolton do, as a matter of fact, pay their sinking fund out of their depreciation allowance. This information comes out in a recent comparative statement appearing in the "Municipal Journal" relating to the electric light finances of Aberdeen, Glasgow, and Bolton. These three Corporations seem to be the only ones in the United Kingdom charging a definite rate of depreciation against electrical plant; and it is instructive to see how the policy works out in every case. Glasgow appears to have taken the bull by the horns with a vengeance—charging no less than £29,360 on this account for the last working year, which has the notable effect

of turning an apparent surplus of some £15,465 into a nominal deficit of £13,895. The question has been raised as to whether this is a "loss" which the law would require to be made good out of the local rates. Probably the intention of the Corporation is to carry it forward against any increased profit of the current year; the figures standing to prove that there is no real profit on the undertaking to be appropriated otherwise. Aberdeen has another tale to tell. Here the gross profit on the working of the undertaking was first charged with the interest and sinking fund, and then an amount of £5066 was allocated for depreciation, which still left a balance of £1701 for the reserve fund. On the face of it, therefore, Aberdeen presents an example of a solvent electricity supply undertaking. But really, it is doubtful if the depreciation allowances are adequate. Accumulators, machines, and motors at 5 per cent. (which is the maximum), electrical instruments at 2½ per cent., and mains and services at 1½ per cent., do not sound convincing. Still, these rates are to the good so far as they go. Glasgow is more robust. Lands and buildings here are depreciated after the rate of 1 per cent.; accumulators, 7½ per cent.; machinery, 7½ and 5 per cent.; meters, 6 per cent.; instruments, workshop tools, and furniture, 5 per cent.; and mains and services, 2½ per, cent. These allowances are sounder; but the revenue account will not defray them up to the present time.

The case of Bolton is different from that of either Glasgow or Aberdeen. The rates of depreciation are handsome—10 per cent. on accumulators, meters, instruments, and motors; and 6 per cent. on machinery, mains and services, and transformers. But after this is written off, the sinking-fund payment is deducted from it, which thus leaves a much smaller sum for depreciation proper than either of the Scotch Municipalities appropriate. Assuming the same ratio of allowance to go on in these cases up to the period of redemption of the loans, the position will be somewhat as follows: Glasgow will have paid back the capital and have accumulated besides the value of the plant in cash, out of the revenue contributed by one generation of consumers. Aberdeen will also be out of debt, and be in possession of a large proportion of the value of the assets in cash. Bolton will have wiped off the original loans, and have something in hand in cash, which may or may not represent the amount by which the value of the assets as a part of a going concern will have deteriorated. The question is, which is the fairest and the most correct treatment of the present generation of consumers, who pay for all? There is a great divergency of opinion on the matter. Some argue that the line taken by Glasgow is oppressive to the first generation of consumers, who are thereby called upon to pay twice over for the capital required for the business. Others contend that the other extreme—exhibited by those local authorities who do not provide for any depreciation at all—is tantamount to living on capital. Yet another party holds that justice is done if the estimated amount of perishing of such assets as are perishable is provided out of revenue, in addition to the sinking fund. There is reason in the request that a Commission should be appointed to consider the subject and make a reasoned recommendation to Parliament with respect to the basis on which depreciation should be calculated. The question of the proper length of loans also comes into the general problem.

That it is time for something to be done in regard to the matter is clear from the following brief summary of the facts of municipal trading. Up to March, 1902, a sum of about 11¼ millions sterling was outstanding on account of the capital of municipal electricity supply undertakings alone. This is being repaid at the rate of something under 2 per cent., while the rate of interest paid on the loans does not reach 2½ per cent. If to these two items is added the insignificant sum of less than £20,000 a year set aside for depreciation, the total charge paid is quite 4¼ per cent. for all capital purposes. It is highly probable, in the judgment of Mr. Henry Shirley-Price, who writes to the "Engineer" on the subject, that this total sum is inadequate for depreciation alone in this particular class of undertaking. Notwithstanding this lack of provision for depreciation, the working shows an annual average loss of £11,707. It is disconcerting, Mr. Shirley-Price remarks, to imagine what the actual loss was. Certainly, a depreciation allowance of less than ¼ per cent. on the outstanding debt is inadequate to even the most modest requirements in respect to antiquation and perishing of the assets, to say no more. And this is the means by which local authorities supplying electricity undersell companies in the same trade, and compete unfairly with gas companies.

Institution of Civil Engineers.—The first meeting of the Institution for the present session was held last Tuesday, when the President (Sir William H. White, K.C.B., LL.D., &c.) presented his Inaugural Address, which, owing to its great length, he read in abstract only. It naturally had reference to the work to which Sir William has devoted his life—viz., shipbuilding and marine engineering; and it dealt exhaustively with the whole subject. It may be remembered that Sir William White's accession to the presidential chair in 1901 was delayed owing to the condition of his health at the time; and the warmth of his reception on Tuesday testified to the pleasure of the members at finding him occupying a position which adventitious circumstances had prevented him filling earlier. It is not a little curious that, as mentioned in the opening sentences of the address, he is the first shipbuilder to be President of the Institution.

MUNICIPAL BUNGLING EXTRAORDINARY.

THERE recently came to our notice some municipal actions in the West which form such an extraordinary illustration of how not to do things, that we are tempted to briefly set forth the story for the edification of our readers. That such an appalling state of affairs as is here indicated should be even possible, is a matter which ought to be taken seriously to heart by ratepayers everywhere; and therefore those interested in gas and water undertakings, which are among the largest contributors to the rates, are nearly concerned in the tale here to be unfolded. We have not heard that there has been any material modification of the condition of things during the past week or two, and so reproduce the information as we received it.

A fortnight ago the inhabitants of Llanelly were reported to be in a state of the greatest possible excitement; but this fact could cause no surprise whatever on the part of those who were at all acquainted with the cause. Slowly but surely the members of the Urban District Council, acting in their capacity of Harbour Commissioners, have been involving the town in trouble of the most serious kind, until at last a state of affairs has been created which must be almost, if not quite, without a parallel among recorded instances of municipal mismanagement. This is the issue of a writ by the Bank of England against the Commissioners in respect of no less a sum than £175,000, borrowed by the latter for the purpose of constructing a dock, which was completed two years ago, though never a ship has entered it. We have said the dock has been finished for two years; but this is perhaps not strictly accurate, inasmuch as it is still in need of—an entrance! In order to make this, it was necessary to cut through a piece of land which has been held by the Courts to belong to a local Railway Company; and as it has so far been found impossible to come to terms with the Company without incurring some large additional expenditure, and the Commissioners have exhausted their borrowing powers, the dock gates cannot yet be opened. Here is a pretty state of affairs for a town whose rates have already reached the by no means insignificant amount of about 11s. in the pound. The population of about 26,000 are indebted to the Bank of England to the extent of some £222,000 (the interest charges on which amount to about £8600 a year); and all this has been spent on works which up to the present time are totally unremunerative. In addition to this, further considerable capital outlay will, as mentioned above, be necessary before the Commissioners can hope to come to terms with the Railway Company; and as if all this were not enough, they suddenly find themselves being pressed by their creditors in such a manner as to render most urgent some decisive step in order to protect their interests.

Completely beaten at all points by the opponents whose right to consideration they have resolutely denied, with their borrowing powers exhausted, their dock not yet earning a single penny of revenue, and their creditors manifesting the greatest dissatisfaction with the condition of their security, the lot of the Llanelly Harbour Commissioners must be very far removed indeed from a happy one. But then, as a brief recapitulation of the facts of the case will prove, they have brought all their troubles on themselves, and so are not deserving of any great amount of sympathy. As must always happen in cases of this kind, it is on the general body of ratepayers that the burden falls. They already have to contribute 1s. in the pound towards meeting the interest payable to the Bank; and he would be a very bold man who would venture to assert that the capital outlay still requiring to be made will not entail a further tax upon them. To make clear the true inwardness of the trouble, it is necessary to give an outline of what has occurred since the initiation of the dock scheme, as well as of some events which preceded it; and we will therefore do this, as briefly as possible.

About twenty years ago, some local people promoted the Mynydd Mawr Railway Company, for the purpose of developing the anthracite coalfield of the Gwendraeth Valley. The proposal was heartily supported in Llanelly; and the then Commissioners allowed the railway to run down along the Carmarthenshire dock to a point where coal shipping stages were erected. The terms arranged were that the Railway Company should pay a nominal sum of 5s. per annum for this right. The contract for the construction of the line was let; but as the Company failed to raise the necessary capital, the railway is still in the contractor's hands. Some years after the granting of this right, the Harbour Commissioners came along with their new dock scheme; and they were allowed three years from 1896 in which to serve notice to treat for any land proposed to be taken compulsorily. They, however, failed to serve such notice on the Railway Company—choosing to regard the right they had granted them as an easement only, and not as a lease. An effort made subsequently by the Commissioners to cut through the lines of the Railway Company and remove their embankment, so as to make a waterway from the new dock to the sea, resulted in the Company obtaining a perpetual injunction restraining the Commissioners from interfering with their property. But against this decision the Commissioners made an unsuccessful appeal.

Now, however, comes what must be admitted to be by far the most extraordinary part of the story. As has been shown, everything turned on whether the document granting to the Company

the right referred to was an easement or a lease. The Commissioners right onwards from the inception of their dock scheme had elected to treat it as an easement; and yet, according to the local papers, some time after the appeal was decided, a letter was unearthed which was written by the gentleman who was then their Clerk, and in the course of which the following words occur: "The change from the mere grant of an easement to that of a lease necessitates alterations"! How much money and trouble might have been saved by the earlier discovery of this epistle, or the remembrance by someone concerned that it had been written! However, neither of these things happened; and, in view of the adverse decisions, the Commissioners had no alternative but to promote a Bill giving them extended time in which to serve notice to treat. The Railway Company petitioned against the Bill, and the parties came to terms by which, in consideration of the railway being diverted, the Company were granted certain privileges—such as free access around the dock, the berths at their loading stages to be kept dredged, &c.—all of which were to be subject to arbitration. This arbitration has now been heard, and has gone against the Commissioners to such an extent that they are still unable to open the dock, and are thinking of promoting another Bill to authorize the borrowing of a further large sum of money for dredging purposes, to enable them to carry out the conditions laid down by the Umpire.

What the end of all the trouble will be, goodness only knows. While the authorities were making up their minds what to do, the writ of the Bank of England was, at the time of our last advices, still hanging over their heads. The ratepayers were decidedly averse to having any further burden thrust upon them; and the Railway Company refused to budge. Truly a deplorable state of affairs! Perhaps the best way out of the difficulty would be for the Bank to take over the dock and work it themselves. Such a solution of the problem would doubtless be viewed with a considerable degree of calmness by the ratepayers; but how greatly it would wound the pride of our Municipalities.

ELECTRIC LIGHTING MEMORANDA.

Electric Heat Radiators—The Finance of the Edmundson Companies—Electric Lighting in Edinburgh.

It is claimed by the trade that the coming winter is to witness a large increase of the use of electric warming appliances. Circumstances have altered since the Crompton Company gave up the losing game of making and pushing electric cooking and heating stoves. Nobody has ventured to revive the enterprise; but it is impossible to overlook the appearance in the market of different makes of electric "radiators," which exhibit the common feature of an elongated incandescent lamp in ground glass, with or without reflectors in metal. These are usually recommended on the basis of a cost of about a halfpenny per bottle per hour. It is a form of competition to which the gas interest will do well to pay some heed. Figures relating to the consumption of current by these radiators are not published; but it would seem that they must take a good deal, or else the old idea about incandescent electric lighting not heating the air of interiors to any appreciable degree must be discarded. Perhaps there is yet another method of making up the bill for these conveniences. Obviously, if the great field of shop and office heating, which gas companies have neglected, is occupied by these electric radiators, the effect on the load-factor of the supply undertakings will be good during the season. It is difficult to believe, however, that such devices, though of considerable size, could make a room comfortably warm in even moderately cold weather. It is one thing to take the chill off, or keep the feeling of damp out of an apartment between the seasons—just now, for instance—and quite a different matter to warm a room during a black frost or a bitter north-easter. As to the appearance of electric radiators, they are less engaging to look at than any gas-fire—which is saying much.

The finance of the Edmundson Electricity Supply Companies occupies the attention of the critic of the "Electrical Times" this week; and in view of the width to which the parent corporation throw their net, the statement here given will prove of some interest to many gas companies. There is no doubt that Edmundsons mean to "make a spoon or spoil a horn;" and in view of the record of the house, it is impossible to wish them anything but good fortune in their plucky endeavour to make small electric lighting undertakings pay. We have never been so narrow-minded as to find fault in the slightest degree with those old established gas-fitting firms who ventured to start electric light branches. There is no earthly reason why they should hold aloof from a class of work which their experience in many ways enables them to do excellently well. Indeed, it is even possible to say with much point that it was only when the best gas-fitting firms elected to go into this class of business, that the style of doing the work was lifted from the philosophical instrument makers' and electric bell fitters' manner, and placed on a sound footing. The moral right of Edmundsons to try and make a living by commercial electric lighting is clear; and we are only sorry that the smaller gas companies cannot do the same. Anyhow, those gas companies in a comparatively small way of business who have an Edmundson Company coming into their district, are better off than if the local authority were to do just the same thing at the expense of the rates. Whether or not Edmundsons are fated to succeed in the long run, they have gone ahead very fast these last two or three years. Beginning on a modest scale, they have already run into a capital commitment of about a million sterling; and they do not betray any present intention of ceasing the pursuit of small and unconsidered trifles in the shape of Electric Lighting Orders. Originally, probably, the idea was to put down installations, and afterwards dispose of them to the local authorities concerned. Shrewsbury was dealt with in this way in 1898, and Woolwich last year. It is doubtful, however, whether there will be many more such transactions. Edmundsons will probably have to keep most of their stations, and work them for what they may be worth. These companies serve the public at reasonable rates; and their generating costs are remarkably low, considering the small scale of most of them. Their economical construction and working are a lesson to municipal undertakings. One of the most striking of the statistical tables relating to the Edmundson stations exhibits the small capacity of urban populations for electric lighting. Over a total of nearly a quarter of a million inhabitants served by these stations, the average number of lamps per head works out to 1·1. This is the scale of public service for which local authorities are content to place obligations upon the ratepayers!

The affairs of the Edinburgh Corporation electricity supply department are discussed by the "Electrician," which felicitates the Administration on having brought present total working costs down to something less than 1d. per unit. This is a figure which only some half-dozen British supply works can show, and is regarded as exceptionally good for Edinburgh, which has no traction load to bring down the average running expenses. The arc lamps used for public lighting in Edinburgh are only charged at £11 apiece per annum, which is probably the lowest on record. It does not pay; but that fact does not trouble the owners of the undertaking. There is another remarkable feature, and that is the large and growing motor load. Last year this rose to 4078 horse power, for which 1¼d. per unit is charged. One wonders whether this pays better than the public lighting. A flat rate of 3¾d. per unit is charged for private lighting consumption, which must be called very low. The net result of these very liberal charges is that the gross profit on the year's working is after the rate of 7·8 per cent. on the capital expended. This is scarcely enough to pay all expenses and provide for depreciation. The Corporation do not subsidize the rates out of the electric light profits, any more than they do from the gas profits; but something ought to be done in regard to depreciation, following the lines laid down by Glasgow and Aberdeen. It is true that a large sum of money—£14,532—is carried forward to the credit of the current year's revenue account; but this is not the safest way to deal with a surplus. The undertaking stands the ratepayers in upwards of £800,000, and has been working since 1895. Whatever the Committee may be able to spare for the purpose out of revenue, should be devoted to providing against the antiquation of the plant and the natural perishing of the value of the assets. Edinburgh might be expected to set a good example of sound financing, and not be content to leave the lead in this respect to other cities. Besides, it is not fair to the municipal gas undertaking to supply too cheap electricity at the expense of capital, which is what is meant by neglecting depreciation.

COMMERCIAL VALUE OF BENZOL.

In the current issue of the "Iron and Coal Trades Review," a writer deals with the subject of the residuals produced in the carbonization of gas coal and the important part they have played in lowering the price of gas. He points out how one of these residuals—tar—has increased in usefulness in the course of years; further discoveries having led to the production from it of various colours and antiseptics, and an extensive group of solvents, varnishes, timber preservatives, lubricants, and fuels, all of which are obtained by inexpensive processes, and are cheaply produced in consequence of the large quantity of tar put upon the market. The author quotes from the paper read by Mr. H. E. Jones early in 1901 before the Institution of Civil Engineers, to show the average yield of a ton of Durham gas coal; and it is there seen that the amount of tar is 10 gallons, or 113 lbs., which, on the 13 million tons of coal carbonized in 1899, means a production of more than 700,000 tons. One of the substances resulting from the distillation of tar is benzol, upon the commercial value of which the author makes some remarks which are worth reproduction.

He begins by calling attention to the fact that, though commercial benzol is now an industry of importance, it was not until 1856 that Hoffmann's discovery, made eleven years previously, of the existence of benzol in the distillates of coal tar became of value, owing to the discovery in that year by Perkin of the first aniline dye-stuff. At that time, it was the practice in England to obtain the light tar oils, and to distil them fractionally; and when England, with her highly-developed gas industry, had the lead in this matter, up to the middle of the eighties, the names of the various qualities became fixed in this country. Now, 90, 50, 30, and 0 per cent. benzols, respectively, give off 90, 50, 30, and 0 per cent. of their volume up to 212° Fahr. and, in any case, give 90 per cent.

below 248°. The last of these will accordingly give 90 per cent. between 220° and 248° Fahr., and consists mostly of toluol.

Going into history, the author says that, according to a recent article in "Die Chemische Industrie," it was M. Collas, of Paris, who first put pure benzol, &c., on the market; but this was done at very high prices. The demand caused new sources of supply to be sought for; and in 1873, Pelouze and Audouin scrubbed the tar vapours out of coal gas, and Caro, Clemms, and Engelhorn washed them out with oil in 1869. This was, however, found to be to the detriment of the lighting power of the gas. In the eighties, the recovery of tar, ammonia, and gas from blast-furnaces came in. The tar was poor in benzol, but the gas contained a good deal of it. In 1884, Carvès took out his English patent (No. 15,920); and in 1887, Brunck and Hussener put the process into a practical form, and introduced it in Germany. In a short time, this source of supply became a very extensive one; and consequently the various attempts to produce benzol by superheating brown coal oil and petroleum residues came to nothing, and were abandoned. All that remains of them is the extraction of benzol from oil-gas tar, and from the liquid deposit produced upon the compression of oil gas.

The increasing supply told upon the prices. In 1882, benzol cost, per 2 cwt., from 175s. to 400s.; in 1885, from 50s. to 90s.; in 1890, from 100s. to 125s.; in 1892, from 40s. to 60s.; in 1895, from 25s. to 60s.; in 1896, from 50s. to 120s.; and in 1897, 1898, 1899, and 1900, the average prices were 65s., 25s., 20s., and 20s. In 1892, there was a cessation in the erection of new works; and in 1895, a very heavy demand indeed. At present, Germany makes about 28,000 tons of benzol per annum, of which about 22,000 tons are employed in dye-stuff works, while the rest is used for carburetting, as a solvent, and for motors. The imports into Germany from England and Belgium were, in the years 1891, 1892, and 1895-99, 7316, 5683, 8317, 11,305, 10,135, 5915, and 5291 tons; and the exports to these countries, 516, 519, 1966, 1539, 1270, 1611, and 2755 tons. In the meantime, all the German chemists paid great attention to questions of boiling-point, &c., and the consumers became more stringent in their standards of purity; so that methods of testing had to be considerably elaborated. The boiling-point alone was found to be an insufficient test or specification. Disputes arose as to whether "90 per cent. benzol" meant one which gave off at least 90 per cent. at 212° Fahr., or exactly that proportion. Then, further, "90 per cent. benzol" may mean 82 benzol and 18 toluol, 92·2 benzol and 7·8 xylol, 90 benzol *plus* 5 toluol and 5 xylol, or 84 benzol *plus* 13 toluol and 3 xylol. The author says the last of these is about what "90 per cent. benzol" should be. He then goes on to point out that "90 per cent. benzols" may differ very widely from one another; but for practical purposes he thinks it is enough to state also the temperature at which 95 per cent. comes over. A good 90 per cent. benzol should not give over more than 93 per cent. at 212° Fahr., and not less than 95 per cent. at 230° Fahr. A good 50 per cent. benzol should give this percentage at 212°, and 90 per cent. at 248°; 0 per cent. benzol, nothing at 212° and 90 per cent. at 248°; pure benzol should give 95 per cent. with a rise in temperature not greater than 33°; toluol the same; and xylol should give over nothing below 277°, 90 per cent. below 284°. The "30 per cent. benzol" has quite disappeared from the market.

The author concludes by saying that the demand for benzol is so considerable that the over-production apprehended when coke-ovens began to contribute to the supply has hardly set in; and at present, through strikes and possible shrinkages in the coke industry, it seems conceivable that there may be a shortage. The prices during the past two years were, however, not profitable; and many works have therefore given up making benzol. But if there should come a scarcity, he considers it will not be due to this so much as to the steadily increasing demand.

Fatalities in Tar-Works.—Attention having been directed by the reports of the Inspectors of Factories, and by the occurrence of fatal accidents, to the risks incurred by persons employed in works in which is carried on the distillation of tar for the production of naphtha, light oil, creosote oil, and pitch, the Home Office has issued a series of precautions to be observed to prevent mishaps. In the last three years eleven fatal accidents have occurred in tar-works. Five of these fatalities were due to suffocation, probably by sulphuretted hydrogen, in cleaning out the stills, and two to the accidental inhalation of sulphuretted hydrogen. Ten non-fatal accidents resulted from the inhalation of the same gas—in three instances during the cleaning out of stills. There have also been other cases of gassing.

Society of Arts.—The first meeting of the 150th session of the Society will be held on the 18th inst., when an address will be delivered by Sir William Abney, K.C.B., F.R.S., &c., the Vice-President and the Chairman of the Council. Among the papers to be read before Christmas will be one by Sir William H. Preece, K.C.B., F.R.S., on "Science and Industry." Four courses of Cantor Lectures have been arranged for Monday evenings during the session; the first being on "The Mining of Non-Metallic Minerals," by Mr. Bennett H. Brough. His first lecture, to be delivered on the 23rd inst., will be devoted to coals and bitumens. Another course will be on the subject of "Oils and Fats: Their Uses and Applications," by Dr. J. Lewkowitsch. These will commence on Jan. 25 and continue till Feb. 15.

COST OF PUBLIC LIGHTING.

As the total annual cost everywhere governs local authorities in their choice of systems for improving public lighting, Mr. J. W. Bradley, the City Engineer of Westminster, must be thanked for permitting publication of his further statistical records of the actual experiences with, and comparative expenses of, the several methods of lighting in the large district of which he has charge. His last return has reference to the quarter ending Sept. 30. It gives the average candle powers of the various types of lamps—both electric and gas—in the city, and costs in several ways—from the initial expense of installation to the total cost per lamp per annum. It may be taken that the electric arcs referred to are samples of those which are, among electricians only, reputed to be of 1000-candle power; the best result Mr. Bradley obtains is 585 candles. The lamps most comparable with the electric arcs are Sugg's high-pressure gas-lamps; and in capital cost, interest and sinking fund, and total cost per lamp per annum, they work out, however tested, much cheaper than the electric arcs. There is some explanation required as to the third group of electric arcs; the cost being very much lower than in the case of the first and second groups. Why there should be the great difference shown is not apparent. The flat-flame gas lamps, as was pointed out when last noticing a report by Mr. Bradley, are altogether out of the running in point of cost, when compared with the incandescent gas systems. Once again they are certified by the figures to be abominably wasteful; and the sooner they are abolished, the sooner will the ratepayers secure a far more efficient system of lighting for a smaller outlay. It may also be noted that, in the Sugg high-pressure lamps, the burners have been re-arranged in trident form; and the tests were taken at three different angles. Mr. Bradley finds that the trident arrangement of incandescent burners is a decided improvement on grouping. In the case of all the lamps save the Pall Mall arcs, the number of lighting hours per annum is 3940; the number for the exception being 3879. The following are the principal columns in the interesting table:—

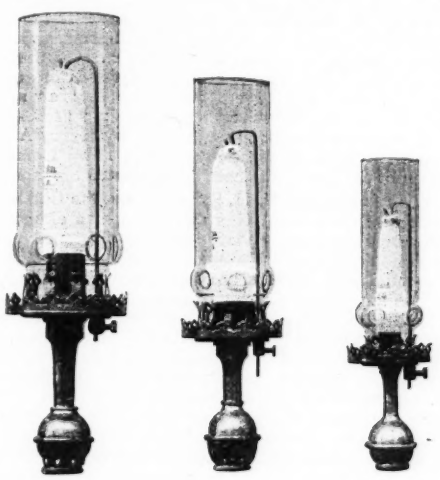
Tests of Street-Lamps (Gas and Electric), with Statement of Costs.

Description and Position of Lamps.	Capital Cost of Lamp.	Interest and Sinking Fund per Lamp per Annum.	Cost of Illuminant per Lamp per Annum.	Cost of Lighting and Maintenance per Lamp per Annum.	Total Cost per Lamp per Annum.
					£ s. d.
Electric arcs, Trafalgar Square (average power 554 candles)	£40	On the 30 years' period (say) £2	£28 0 0		30 0 0
Electric arcs, Pall Mall (average power 585 candles)	45	On 14 years' period of Contract (say) £4	£30 0 0		34 0 0
Electric arcs, Hyde Park Corner (average power 563 candles)	—		£22 0 0		22 0 0
Refuge lanterns, 4 incandescent mantles, Victoria Street (average power 113 candles)	15	On 30 years' life (say) 15s.	8 15 6	3 16 0	13 6 6
Sugg's high-pressure lamps, Whitehall (average power 481 candles)	15	Do. 15s.	13 6 2	4 3 10	18 5 0
Ordinary single incandescent mantle, Victoria Street, each 4·2 c. ft. per hour (average power 49 candles) . . .	6	Do. 6s.	2 0 0	1 4 0	3 10 0
Ordinary flat-flame, Whitehall, 2 burners, each 6·16 c. ft. per hour (average power 58 candles)	8	Do. 8s.	£5 0 2		5 18 2
Ordinary single incandescent mantle, Carlton House Terrace, each 3·25 c. ft. per hour (average power 41 candles)	6	Do. 6s.	1 10 11	1 1 0	2 17 11
Ordinary flat-flame burners, Chandos Street, 3 burners, each 5 c. ft. per hour (average power 49 candles) . . .	8	Do. 8s.	£9 0 10		9 8 10
Refuge lamp, Victoria Street, three "C" burners (average power 107 candles) . . .	15	15s.	5 18 9	3 0 0	9 13 9
Footway lamp, Victoria Street, two "C" burners (average power 77 candles) . . .	6	6s.	3 19 2	1 13 0	5 18 2

The Graduates' Association of the Institution of Mechanical Engineers held the second meeting of this session last night; the programme consisting of a paper by Mr. Walter H. A. Robertson, on "Heating and Ventilating on the Plenum System."

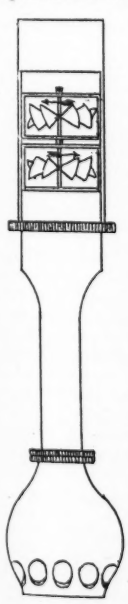
THE "NOVITA" INCANDESCENT GAS-BURNER.

LECTURING to the Yorkshire Junior Gas Association (as reported last week), Professor Arthur Smithells explained to the members how surprisingly the efficiency of a Bunsen flame depends upon the complete mixing of the gas and air; and he showed his audience how the mixing is effected in various incandescent gas-burners of well-known make now on the market. The very real relation that thoroughness in the intermingling of the gas and air bears to the efficiency of the incandescent burner is indeed well established; but there has been one great obstacle to its general recognition, and that is the question of initial expense. To get a more intimate admixture of gas and air than can be obtained by burners in common use has meant the adoption of special mechanical devices (and there have been many of them) independent, or as an integrant, of the burner, at an expense which the ordinary consumer declines to incur. Besides this, some of the mechanical contrivances forming part of this class of burners have been of a complicated character, which is in a gas-burner a feature too objectionable for the public to accept it. Moreover, complication adds to the cost. However, recently we have come across a special burner which, by its simplicity of construction and yet effectiveness in the object sought to be secured, is likely (if the cost is right) to attain a fair amount of popularity, and that is the "Novita."



No. 2. No. 1. No. 0.

This burner (samples of which have been forwarded to us from Brussels for trial) is known to but few gas engineers in this country; but it has received a large amount of patronage on the Continent. It is one which, by, as said, very simple automatic means (which we should imagine cannot well get out of order) produces a very thorough admixture of the gas and air—first, by the construction of the lower part of the burner itself, but chiefly by the incorporation in the head of the burner of two small helical fans revolving in opposite directions just under the wire-gauze cap—the fans being rotated at a remarkable velocity merely by the inflowing current of gas and air. Rotating fans in burners, of course, are not by any means new; but it may be repeated that we have never come across their application in a simpler or more effective form than in the case of the "Novita," with the further favourable consideration that their introduction does not in this case in any way add to the size of the burners. The bottom of the burner—forming the first mixing-chamber, and containing the gas-injector and the air-inlets—is bulbous in outer form; but the interior is conical in shape. The gas-injector is also cone-shaped; and the air-apertures, too, are of a shape and in such a position as to have the effect of giving the air and gas a sharp upward flow—in fact, the whole interior construction appears to have had this purpose in view. From the ample lower chamber the gas passes into a short constricted length of stem, which at the top expands into a chamber of wider dimensions, in which are the two little revolving fans, and by which the complete mixture of the gas and air is brought about. Over this chamber slides the burner-top, so that the point of combustion is only just above the upper fan. This has been settled by the inventor as the most sensible position for the admixture to take place; his common-sense argument being that gas and air being two fluids of different densities, the benefit of the mixing can be best and most fully realized if it is effected at, or as near as possible to, the place of combustion—in other words, by means of his invention, the mixture of gas and air occurs, in spite of their different densities, at the very moment of combustion. Professor Smithells states that this intimate admixture is what is required to secure the greatest efficiency from a Bunsen flame; and therefore the inventor of the "Novita" burner has good justification for his claim that the heat of the flame obtained with the burner is greater than would be found under ordinary circumstances, and that consequently a smaller consumption of gas is required, as compared with ordinary burners, to obtain a given illumination from the mantle. The express motion imparted by the inflow of gas to the two diminutive fans is interesting.



Before noticing the reports as to the illuminating power obtained, there are a few other features which may be noticed. The burner is made in various sizes; but the construction is similar in all cases. The body of the burner is of solid brass, and has a good and substantial appearance. The bulbous chamber at the bottom is provided with a collar over its lower half for the regulation of the air supply. The top of the burner (which simply slides on) is supplied with a wire mantle support outside of the mantle; the support being adjustable to any height by a thumb-screw just below the gallery. The chimney is provided with side holes for lateral air supply; the air being directed on to the mantle just at the point where combustion is taking place within it. No air is admitted at the base of the chimney.

The examples of Nos. 1 and 2 burners which we have had in use for some days now have been giving constant results of undeniable excellence; and there appears no reason why they should not continue to do so. The small fans cause no unpleasant irritating noise—in fact, it is necessary to listen attentively to detect the movement. According to several reports to hand, the burner has been the subject of complete study by many competent authorities on the Continent; and their opinions appear to be summed up in the words "perfection and economy." The photometric results submitted with the burners are too numerous for reproduction. Many of them are, however, corroborated by several gas men. The observers may be taken to agree that for the No. 1 burner, with a consumption of between 3 to 3½ cubic feet of gas, an illuminating power of approximately 140 candles can be obtained; while the illuminating power for No. 2 burners is in the region of 200 candles for (say) a consumption slightly under 5 cubic feet of gas. These are remarkable figures; and we should like to have the results from any engineers in this country who have submitted the burners to photometrical tests. The durability of the lighting power has also, the documents to hand inform us, been subjected to prolonged trial; and in one case (the statement is made) the burner gave the same results after 2808 hours' use as at the start. We cannot question these figures nor confirm them at present; but we are satisfied that the light obtained from the burner is excellent in quality and brilliance. This we can only attribute to what we believe to be the fact—that the burner secures a high flame-efficiency by the perfect admixture of the gas and air in the manner described.

WEST'S CHARGING AND DRAWING MACHINERY.

FROM the West's Gas Improvement Company, Limited, of Miles Platting, Manchester, we have received a book to which we prefer to apply a more dignified title than that of a "trade catalogue." It is a book containing a large amount of not only interesting but useful matter for the gas engineer who is concerned—and what gas engineer is not?—in the carrying out of the carbonizing and other operations of the retort-house on economical lines. Having just finished an examination of the book, a list of gas companies and corporations supplied with West's machinery for charging and drawing retorts has last come under notice; and it was observed that the list opens with the line "Maidstone Gas Company —manual machinery installed in the year 1875." This carries the memory back a good many years, and calls to mind much that has taken place in the development of machine work in retort-houses since the installation at Maidstone by the former Engineer of the Company (Mr. John West). The list of companies and corporations who have adopted the plant that has been the outcome of his skill and inventive faculty, is indeed an imposing one; and yet as we compare the number of gas-works in the country with that of those who have adopted machinery, it indicates that the field for mechanical stoking has not had much more than its borders touched.

The book is divided into sections—dealing with the Company's separate power charging and drawing machines, their combined charging and drawing machine, and their manual charging and drawing machines. The various kinds are illustrated with some very fine wood engravings; but in the mass of illustration presented, the engineer will find, in the sections and plans, showing the application of the machinery to existing retort-houses in almost every conceivable circumstance, much that will especially appeal to his interest and study. Some tabulated particulars of the working of the separate and combined machines from actual experience are included in the matter—similar to the information in this respect already published in the "JOURNAL." The installation of machinery at the Crefeld Gas-Works, which was the subject of description in Vol. 83 of the "JOURNAL," has an extended notice. In this, one's attention is particularly directed to

the saving that the machinery effects in wages; but, in addition, there is a claim for "a largely increased make of gas from the same quantity of coal, and therefore fewer retorts are required," as a consequence of the use of machinery. Briefly, it is stated in the descriptive matter that by the charging of the retorts with uniformly broken coal equally laid by the machinery, notwithstanding the age of the retorts—some over 1000 days, and none less than 600 days—"a considerably increased yield of gas was secured; for whereas the make of gas by hand stoking with a charge of 205 kilos of coal was 28·5 cubic metres of gas per 100 kilos, the make is now increased to an average of 32·03 cubic metres of gas per 100 kilos, which means, with a yearly production of 11 million cubic metres, a saving of 547 double waggons of coal, or £3800 per year." Tables showing the particulars of working before and after the installation started are included in the book. We have no hesitation in recommending gas engineers who have not received a copy to take steps to obtain one. It has been produced at an expense, and with a care of selection and preparation of matter and illustration, that merit the fullest praise.

TO ATTRACT NEW CONSUMERS.*

A VALUABLE German *brochure*, entitled "Kein Haus ohne Gas!" (No House without Gas) has reached its second edition, and a sale of 120,000 copies. It is the work of Herr F. Schäfer, the well-known Engineer of the German Continental Gas Company at Dessau, and is issued under the auspices of the German Association of Gas and Water Engineers. It comprises 48 pages (6 in. by 4 in.), in which the advantages of gas are set forth in a lucid manner, without the use of technicalities, which might puzzle the householder of ordinary intelligence, for whose instruction and benefit the work is compiled. First of all, common prejudices against gas are referred to, and shown to be unfounded. Then the advantages of gas for lighting are set forth, and some instructive comparisons are made with oil and electric lighting. Next comes sound information on the utility of gas for heating and cooking; and then a few pages are devoted to gas-engines and prepayment meters. Hints to consumers on services, control of pressure, incandescent lighting, automatic igniting devices, fittings, and stoves, bring the little pamphlet to a conclusion.

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see page 368.)

THE Stock Exchange reopened on Tuesday (after the usual November close-day on Monday) in a rather listless state. Movements were very few and slight in degree; and their direction was variable and uncertain. Business all through the week continued to be much restricted; and the tendency was sometimes one way and sometimes the other. As the result, prices on the week show about a balance between the ups and downs, without serious change anywhere. In the Money Market, the tendency ruled decidedly easy pretty well all through till near the close, when there was a slight stiffening. In the Gas Market, business has on the whole been only moderate, though at times there were signs of a possible outbreak of activity. There was a predominant tendency apparent, and not many changes in quotation were made; but the gains fairly outbalanced the losses. In Gaslight and Coke issues, the ordinary was scarcely so strong as in the previous week; and it had to surrender the point it had then gained. It opened on Tuesday at 86¾, and promptly began to shrink until on Thursday it just touched 85. But then came a slight rebound; and the closing mark of all was 86½, or only ¼ worse than the opening. The secured issues were fairly brisk; and though a little hesitating at the start, they eventually closed firm. The maximum and the preference changed hands at top prices, though they failed to improve upon them. South Metropolitan was in a very uncertain mood. On Tuesday, a special bargain was done at 117¼; on Thursday, it was up to 120; and on Saturday, the final mark was 118¼. In Commercials, only one bargain, at a cheap price, was marked. In the Suburban and Provincial group, some two or three transactions were the sum total of the week. Only British attracted attention; and its quotation advanced. In the Provincial Exchanges, all three Sheffields had a further rise; and Newcastle gained a slight advance. The quotation of the latter stock on the Newcastle Exchange is 5 per cent. higher than on the London Exchange. Is the London quotation a "reasonable test of value?" Business was better in the Continental Companies, especially in Imperial, which advanced a couple of points. Among the remorter undertakings, Cape Town mortgage was higher; and San Paulo was lower. In the Water Companies, there was a good show of activity on Tuesday; but it quickly died away. The only change in quotation was a point gained in Southwark ordinary.

Operations in Gas were moderate on Tuesday, without change. In Water, Southwark rose 1. Wednesday was quieter. Gaslight ordinary fell 1; but Imperial rose 2. On Thursday, transactions in Gaslight ordinary were at their busiest. British rose ½. Friday and Saturday were quieter days; and no further change in quotations took place.

* "Kein Haus ohne Gas!" von Franz Schäfer, Ingenieur in Dessau. München und Berlin: R. Oldenbourg; 1904.

PERSONAL.

Mr. P. B. WATSON, of Stranraer, was on Friday elected Manager of the Wishaw Corporation Gas-Works. There were six candidates on the short leet; and there having been equal votes between Mr. Watson and Mr. A. Mackay, of Dawsholm, Glasgow, Provost Stalker gave his casting vote in favour of the former.

The municipal election at Banbury resulted in the retention of Mr. W. R. COOPER, the Engineer and Secretary of the Banbury Gas Company, as a member of the Corporation. We are pleased to find that his services are so highly appreciated by his fellow-townsmen that for the fourth time they have returned him at the head of the poll; the number of votes given to him being 1163, against 943 for the next highest candidate.

Mr. F. DAY, the Mayor of Southmolton, has received from Mr. H. A. Willey a massive and very handsome silver-gilt key, as a memento of the recent ceremony of turning the gas into the new holder, the proceedings on which occasion were reported in the "JOURNAL" for Sept. 15, p. 691. On the obverse at the top are Mr. Willey's initials, and underneath his Worship's crest and motto, beautifully executed in coloured enamel. In the centre, also in enamel, appears the borough coat-of-arms, and at the base the Mayor's initials, surmounted by a crown. On the reverse, in enamel, are Mr. Willey's crest and the coat-of-arms and motto of the "Ever faithful" city, together with the figures "1903." The cross-bar bears the following inscription: "Presented to the Mayor of Southmolton, Fred Day, Esq., by Henry A. Willey, of Exeter, the Engineer to the Southmolton Town Council, on the completion of the gas-works extension, September, 1903."

Last Wednesday, Sir W. H. STEPHENSON, the Chairman of the Newcastle and Gateshead Gas Company, was entertained at a complimentary banquet by a large number of friends, to celebrate the completion of fifty years' association with Newcastle Quayside. So far as municipal matters are concerned, Sir William is better known than any of his contemporaries; and he has enjoyed the unique distinction of having been four times Mayor of the city—in 1875-6, in 1884-5, in 1894-5, and in the present year. He has given to the city two branch libraries and a statue, has always been a generous friend to his own and other religious bodies, and has warmly supported all movements which have had for their object the well-being of the community. He has therefore won the gratitude and esteem of his fellow-citizens generally. The Deputy-Mayor (Alderman Richardson) presided, and proposed "Our Guest," which was very heartily received. In the course of his reply, Sir William contrasted the gas supply to Newcastle in his early days and now. He said the cost of gas in 1853 was 4s. per 1000 cubic feet, and the number of public lamps was 1885; whereas now it was 12,372. The cost of the coal carbonized for gas making in 1853 was £5198, and in 1903 it was £136,663. The quantity had increased from 20,055 to 283,439 tons; while the bulk of gas made had risen from 150,152,000 to 3,065,379,000 cubic feet. Sir William gave a number of other interesting statistics showing the growth of the city in the past half century, and resumed his seat amid applause.

OBITUARY.

A cablegram from the New York correspondent of the "Daily Telegraph" states that Mr. PHILIP ALLEN, lately the Secretary of the Central Union Gas Company of Bronx, and a large stockholder in the Consolidated Gas Company, dropped down dead in the street the previous night from heart disease. The deceased gentleman was fifty years of age.

Mr. W. SMITH, who was Manager of the Helensburgh Gas Company for upwards of fifty years, died at his residence in Helensburgh on Thursday. He was 78 years of age. The gas-works at Helensburgh were erected under the superintendence of Mr. W. Smith, the father of the deceased, who had given up the post of Gas Manager at Lanark to take up the duties. Shortly after the completion of the works, the father went to Barrhead to fulfil similar duties; and in July, 1847, his son became Manager at Helensburgh. In the autumn of 1897—having completed fifty years' service at Helensburgh—Mr. Smith was presented by his numerous friends with a silver salver aud a purse of sovereigns. Within a very short time afterwards the Corporation of Helensburgh took over the gas undertaking; and, to the surprise of everybody, Mr. Smith's services were not retained. This was a great blow to his gentle spirit; for the gas-works, which he had assisted to build, were as the apple of his eye. His management of the works had been most successful; and it was therefore felt by others as well as by Mr. Smith himself, to be a most cruel proceeding to suddenly deprive him of his means of earning his livelihood when there was no apparent reason for the step. Mr. Smith was highly popular among his brethren, a number of whom, by their presence at his funeral on Saturday afternoon, showed their appreciation of his sterling and worthy qualities.

COMMUNICATED ARTICLE.

THE ARRAIGNMENT OF GAS REFEREEISM.

By C. E. Jones, Assoc.M.Inst.C.E., of Leyton.

(*Concluded from p.* 288.)

Cost of Removing Sulphur Compounds.—It is estimated that complete sulphur purification, if it were insisted on, would cost the Metropolitan Gas Companies 2d. per 1000 cubic feet of gas sold, or £300,000 a year; and as the consumer does not demand such a sacrifice, he saves this amount annually. Applying these figures to the whole of the gas industry of the kingdom, £1,250,000 sterling would be required annually to ensure this ideal state of perfect purification; and he who brought it to this condition of perfection, would certainly repent of his ingenuity.

Combustion of Sulphur.—It is hardly necessary to observe that sulphur requires its temperature to be raised considerably before combining with atmospheric oxygen. At 500° Fahr., it takes fire and burns with a pale blue flame, producing a permanent gas, which, after cooling, will be found to occupy the same bulk as the original oxygen, and to have doubled its density; the three volumes becoming condensed into two, known as sulphurous anhydride or sulphurous acid. This transparent, colourless, non-inflammable gas is capable of extinguishing burning bodies. Water absorbs more than 40 times its bulk of the gas, the fluid strongly reddens litmus paper, and furnishes sulphurous acid. In its gaseous state, it is useful as a fumigating agent. It temporarily arrests the decomposition of meat, and is employed in home-made wines and cider for checking fermentation. Like chlorine, it possesses great bleaching powers; but it differs from that gas in not injuring the fabrics that are operated upon. Should the colour be apparently destroyed, it can be restored by the action of an alkali or stronger acid. Though supposed to be poisonous, many persons inhale it for throat and chest affections.

Under certain conditions, it takes up another combining weight of oxygen in the presence of water; and when this takes place, sulphuric acid is formed, thus $SO_3 + H_2O = H_2SO_4$. This is the acid which constitutes the basis of our chemical manufactures, and is such an important article of commerce. It is charged, in connection with the combustion of coal gas, that the destruction of leather book-bindings is due to this acid—a charge which, while in cases it cannot be denied, is much exaggerated by pronounced theorists. That sulphuric acid is an enemy to book-bindings is established; but its familiar ravages on leather bindings and other substances take place in libraries from which coal gas is religiously excluded. It becomes necessary, therefore, to seek elsewhere for the cause of the effect. Owing to this property of the gas, much importance is attached by imperfectly informed persons to the desirability of removing the whole of the sulphur compounds from coal gas destined for domestic consumption. Much fervent zeal is displayed in the discussion of this point; but it is quite possible to be misled, and to attach undue importance to sensational statements of the corrosive action of the products of combustion of coal gas. Harmful as they are to the industry, and unnecessarily alarming to the public mind, and possessing the advantage of creating the first impression, these repertorial accusations are not at all times easy of replication.

Quantitative Considerations.—Precise diction is highly desirable in matters of technical science; laxity of expression leads to misinterpretation, venial distortion, and unconscious false deduction. Why, then, it may be asked, is the practice of comparing weights with volumes persisted in? It is obvious where inter-comparableness is invited and inevitable, that the custom is fraught with inconvenience, and not altogether fair to the intelligence of ordinary mortals. Weight should be comparable with weight, and volume with volume; but the Gas Referees employ a mixture of the two, and in their phraseology 17 or 22 grains, as the case may be, of sulphur, other than sulphuretted hydrogen, are permitted in every 100 cubic feet of purified gas. This is well understood by experts. To non-technical intellects, however, it is by no means clear; and it is often taken to imply 17 and 22 per cent. of sulphur in the bulk respectively. This is not so, and was never intended by the framers of the clause. At all events, as charity is said to be a universal duty, let us hope not. Assuming that 100 cubic feet of coal gas weigh 22,500 grains (about $3\frac{1}{2}$ lbs.), 22 grains of which is sulphur compounds, we have $\frac{22,500}{22}$ = 1022 parts. This would result, if all the sulphur is converted during the process of combustion into sulphurous acid, in the production of 0·0352 cubic foot of sulphurous anhydride or dioxide. To burn 100 cubic feet of gas in an incandescent burner consuming $3\frac{1}{2}$ feet per hour would require about 28 hours, or four December evenings from (say) four until eleven o'clock = seven hours each. This gives 0·0088 cubic foot per evening, or 0·00125 cubic foot per hour of sulphurous acid. In an ordinary room of 1560 cubic feet capacity, this proportion is perfectly innocuous, infinitesimal, and unworthy of serious consideration.

By exposing test papers to the air of towns, even sulphuretted hydrogen can be detected easily; and also in rural localities, remote from human habitations and industrial centres, the author has tested for, and found, the gas in localities in high repute for pure air. On the hills and in the woods of Derbyshire, it is there; even sylvan dales and aromatic farmyards attest its presence. No one complains or even suspects its existence. The gas can be detected in quantities so minute as 1 part in 10 million parts, and at altitudes of 200 to 700 feet above sea level. Not a trace of this gas is allowed in that supplied to London, under a penalty of £50; the discolouration of paper saturated with a solution of salts of lead being conclusive evidence of its presence, as before stated.

Sulphurous acid gas is said to attain sometimes to not less than one part in 1000 parts of Manchester air. Such a proportion of sulphur as this would, of course, vitiate any delicate test being made for bisulphide of carbon in coal gas by means of its combustion; and quantitative exactitude can only be secured by purifying the air of the laboratory. This is not done in London, where the only precaution taken is to consume the gas in an alkaline atmosphere in a room where no other gas is burning. It follows that the returns for residual sulphur, instead of being mathematically correct, are too high. There is ever a source of error in the local atmosphere. It is admitted that nine-tenths of the impurities of a dwelling, whether arising from animal respiration, fuel, or light combustion, are removed by the common sources of natural or structural ventilation. What remains is not worth the fuss made about it by pure scientists, who strain at a gnat, but readily swallow a camel. How the people contrive to exist and manage to enjoy life and good health, increase in populative numbers, and die at good old ages, surrounded as they are with poisonous air and beset with Pandora's evils, is marvellous and quite beyond the comprehension of the masses. May we be saved from insanity in science! We have maladies enough and desire no more.

Advantages of Extending the Limit of Bisulphide of Carbon to 30 Grains per 100 Cubic Feet.—One advantage would be to remove the carbonic acid and a large proportion of bisulphide of carbon by washing the crude gas in closed vessels, and finishing with hydrated peroxide of iron, and totally abolish lime, with its pestiferous smell, from gas factories in London. This would reduce the cost of production by 1d. per 1000 cubic feet—a saving of over £15,000 a year—a further saving of the amount now paid in fines and legal costs for excesses (one company pays £200 per annum), the complete abatement of the foul-lime nuisance, and prolongation of the term of natural existence of the Metropolitan gas engineers, whose lives are said to be rendered perfectly intolerable by the official requirements of the Referees. If the Aristotelian axiom be accepted (and individually we belong to the State), the Board of Trade can do the State some service by prohibiting forthwith any system of refined gas purification that shortens life, and ceasing to make the wives and children of gas engineers widows and orphans. The evidence of eminent chemists and physicists declares that an addition of 10 grains of sulphur per 100 cubic feet to London gas would make no difference to the consumer; and, again, 30 grains of sulphur would give 0·048 cubic foot of sulphur dioxide—a quantity academically interesting, but of no practical importance. On the other hand an increased quantity of lime would be available for building agricultural, and other industries.

Summation.—Whatever may be the outcome of this inquiry, it is evident from the foregoing that, like poverty and crime, want and abundance, sulphur is always with us here, and, according to demonism and the Salvation Army, will not be totally unknown hereafter. Would it not then be to the public advantage to give the proposition of the gas purveyors a trial, and officially permit as the maximum 30 grains of bisulphide of carbon, instead of 22 grains as at present? The adoption of the proposal would, without entailing finality, be a material convenience to the Companies, and an immense gain to the public interest, since its effect would be felt in cheaper gas and an abatement of the foul-lime nuisance, which no minor metropolis under the sun tolerates. Of two evils choose the least. In Continental and alien cities, Refereeism is unknown; sulphur compounds, being insignificant, are ignored; gas makers have a free hand; and consumption unceasingly increases. Abroad, coal gas encounters no unfriendly treatment, needs no vindication, and prospers by virtue of its economic qualities, disdaining the legislative coddling extended to it in the Metropolis of the world. An industry one hundred years old can take care of itself, stand or fall without the swaddling bands of infantile necessity—antiquated obsolete gyves which impede its expansive movements, put manacles on its latent powers of trade, restrain the limits and fix the bounds of its industrial ambition, and (Oh, shame, where is thy blush?) set it in the felon's dock amid abandoned thieves and depraved malefactors, to recover miserable penalties for the presence in the gas of a few grains of excess sulphur, or a few atoms of carbon deficient.

Can the discouragement and degradation of an important native industry any further go? Not unless the pillory, hempen suspension, and the chamber of horrors, be invoked. Well may the Chelsea Sage dub us "mostly fools," after a study of gas legislation. Ah! exclaims the enthusiastic faddist and his shallow followers, Why should coal gas be permitted to pollute and poison London's atmosphere with tons of sulphurous anhydride? Does it do this? Let us institute a friendly comparison to assist in arriving at the answer to the question. Over 18 million tons of bituminous coal are consumed annually in Metropolitan fire-places,

and millions of domestic and factory chimneys belch forth unpurified products of combustion. The impossibility of effecting perfect combustion in ordinary furnaces or in open grates is recognized. Porosity aids combustion; and for the want of it coal lies in the grate surrounded more or less by heat and flame. Imperfect combustion therefore takes place; the interior of the coal, being subjected to destructive distillation, produces, among other things, sulphurous compounds in considerable volumes. Sulphuretted hydrogen is abundantly produced, and other sulphur compounds are evolved, and ammonia and its compounds and other gaseous impurities bountifully distributed, without the slightest attempt to render these fumid substances innoxious.

On the other hand, the London gas maker uses just one-fifth of the quantity of coal above named, and produces a gaseous fuel free from these impurities, he arrests and fixes all the sulphuretted hydrogen, afterwards recovering the sulphur for industrial uses. Smoke is annihilated, ammonia converted into its salts, and infinitesimal quantities of sulphur compounds only are permitted to remain in the gas. The wasteful employment of native coal, being a national sin, will assuredly be followed by national punishment. It may be considered at this epoch the primary source of the country's wealth—its naval, maritime, and manufacturing supremacy. To husband it becomes a national duty, since, unfortunately, its exhaustion is within measurable distance, and its replacement or reproduction impossible. One auxillary means to an end may be found in wisely applying the principles of destructive distillation to the mineral, and curtailing its use in a raw state for purposes to which it is unsuitable (such as open grates) and encouraging the use of gaseous fuel—the most scientific method, by the way, of obtaining heat by the combustion of carbon and hydrogen compounds. There is, therefore, no justification for the statement, so thoughtlessly made, that the Metropolitan Gas Companies aim at polluting the atmosphere with sulphurous acid. Quite the contrary is the case.

Although sulphurous acid may be said to be everywhere, an inappreciable quantity is emitted by gas-burners, or traceable to the combustion of bisulphide of carbon. Its presence in the atmosphere is a positive advantage antiseptically; the important question to consider is the local situation and the dose. To administer the latter to wasteful and ridiculous excess is risky; danger and death lurk there. Between the atmosphere of the Inner Circle (Underground) Railway and Hyde Park, the disparity is great. Yet sulphurous acid is present in both places—in the former to excess, in the latter in homœopathic quantities. Dosology apparently is a lost, forgotten, or neglected science. "The means that Heaven yields must be embraced and not neglected," was penned by the same dramatist who advised us to "throw physic to the dogs." Poor dogs! unkind dramatist! Yet the manner of embracing or neglecting the means is all. To object to an average of 8 grains of bisulphide of carbon additional in London gas is to split straws, and savours of capriciousness. This increment would add about 3200 cubic feet of sulphurous acid per hour to the Metropolitan atmosphere—a room 38 feet cube would store a day's make. At all events, tentative experience may be gained by granting a three years' licence limiting the maximum to 30 grains per 100 cubic feet. At the end of the period, it would be found that the consumer would not be penalized, but would probably be paying 2d. per 1000 cubic feet less for gas than at present.

The importance of photometry declines with illuminating power. The latter has fallen from its high estate of 22 candles to 14—a reduction of 63 per cent.—and nobody seems one penny the worse. Finality is unknown in science, stability is secured by progression, stagnancy demoralizes, inactivity enervates, change is salutary. Prior to 1868, the London Gas Companies numbered 13, and were the objects of expensive and harrassing agitation, which, to his honour be it said, the then President of the Board of Trade—the Rt. Hon. John Bright—boldly discouraged, and he declined to further harass industrial enterprise by legislation. Protection from the Flintoffs of the day was sought and found in Refereeism; and though the Companies crowed with delight at the coronation of their "King Log," after 35 years evolution "King Log" is dethroned and "King Stork" reigns autocratically. Fearful of extermination, they call loudly on Jupiter to save them from "King Stork" and restore to them the Metropolis Gas Act, 1860. This modest request means the abolition of the Board of Referees, and the placing of the Metropolitan Gas Supply under the general law applicable to the kingdom in general with regard to gas undertakings; or, in other words, under the supervision of the local authorities instead of the Referees. The latter officials are not likely to regard with favour their forced retirement, considering the fact that the appointment, being an annual one at the pleasure of the Board of Trade, presumably disentitles them to any compensation for loss of office.

The experience of a third-of-a-century has not converted either suburban towns or provincial cities to the London system; and where any overlapping of the district of supply occurs, such as part of a Suburban Company's supply intruding into London proper, the Companies prefer the supervision of the local authorities to that of the Metropolitan Gas Referees, and Parliament has invariably declined to extend the jurisdiction of these officials. Their abolition would certainly have the effect of assimilating gas law and practice all over the kingdom. It is unlikely that this will be affected yet. Following the example of the Water Board for London, we may have a Gas Board established on similar lines ere long. Change is in the air, and coming events cast their shadows before. Who can tell what will happen in these Edwardian days to the gas industry? A return to this Act would, however, be beneficial, from the public point of view, on the ground of expense alone. Much of the expensive machinery of Refereeism would not be required; and now that the consumer is made by the sliding-scale a participator in the profits, he has a direct interest in the gas company, though not called a shareholder. If the consumer could be induced to take an active and intelligent interest in his gas supply, it would be an immense gain both to himself and the purveyor of the article. His apathy to Gas Refereeism, lowering of candle power, &c., may be taken as evidence of indifference to both sides. Like the vivacious Mercutio, he exclaims, "A plague o' both the houses."

The Companies appear to have no confidence in a Board whose constitution is at variance with the Act of Parliament. The practical element of gas engineering passed away with the late F. J. Evans, and has never been reintroduced. The ending or mending of the Board may therefore be expected—if not at present, at some future date. No special circumstances demanding differentiation from other large towns are incidental to London or its suburbs. Finally, sulphur compounds in coal gas furnish an academic pastime, a philosophistic toy, an abstruse chemical problem of no industrial utility, present impediments to trade, impede progressive development, and exhibit in fulness the dimensions of a huge fallacy, which thoroughly practical communities have long ago relegated to that subterranean pavement constructed of bad material, but with good intentions.

TECHNICAL RECORD.

AMERICAN GASLIGHT ASSOCIATION.

Thirty-first Annual Meeting at Detroit (Mich.).

The Thirty-first Annual Meeting of the above-named Association was held in the Russell House, Detroit (Mich.), on the 21st and 22nd ult., under the presidency of Mr. Alten S. Miller, of Baltimore. We learn from the summary of the proceedings contained in the last number of the "American Gaslight Journal" to hand that the meeting was in every way a success, whether regarded from the business or the social standpoint. There was a good attendance (about 200 being present); and the weather was all that could be desired.

The meeting was opened at ten o'clock on the first-named day by the President introducing to the members the Mayor of Detroit, who gave the Association a cordial welcome to the city. These preliminaries having been disposed of, the report of the Council was presented. It recorded that 71 gentlemen had been proposed for active membership, 20 as associates, and 36 for junior membership. All were duly elected, and invited by the President to avail themselves of their newly-acquired privileges. The reading of the reports of the Secretary and Treasurer (Mr. A. E. Forstall) followed, and was succeeded by an address by Mr. F. H. Shelton, the President of the Western Gas Association, giving an indication of what that body propose to do in the way of showing gas to the best advantage at the St. Louis Exhibition next year. The main features of the scheme have already been given in our columns. The report submitted by the Trustees of the Gas Educational Fund was next considered; and it afforded proof that the educational measures adopted during the first period of the administration of the fund have been of great benefit to many. The fund lost its Treasurer by the death of Mr. Eugene Vanderpool in July; and Mr. William R. Beal, who was President of the Association last year, has been chosen to succeed him. The following officers for the ensuing year were elected:—

President.—Mr. Rollin Norris, Philadelphia.
First Vice-President.—Mr. E. G. Cowdery, St. Louis.
Second Vice-President.—Mr. C. F. Prichard, Lynn.
Third Vice-President.—Mr. C. R. Faben, Toledo.

Next came the Inaugural Address of the President. Our contemporary says its lines were quite different, as to their import, from what one would have expected from a man of his training, methods, and habits; and the fair inference to be drawn from it was that he had not lived in New York in vain. The address having, as usual, been referred to a Committee, two reports were submitted from the Committees on Municipal Ownership and Research respectively; and each Committee was re-appointed. A few queries from the "Question Box" were next disposed of; and then the thanks of the Association were accorded to the Committee to whom had been referred the subject of the advisability of having "A Uniform System of Accounts for Gas Companies." These matters occupied the members till the midday interval.

The afternoon sitting commenced at half-past two. The first matter to claim attention was a paper by Dr. A. C. Humphreys, the President of the Stevens Institute of Technology, Hoboken, entitled "Our Correspondence School." Next came the paper by his associate in business—Mr. A. G. Glasgow—on "The Policy of Gas Enrichment: Illustrated by London Practice," which was given in full in the "Journal" for the 27th ult. (p. 219).

It was a misfortune that, owing to the sudden illness of the author (who, when on his way to America to attend the meeting, was, we learn, stricken with something akin to peritonitis), he was unable to read it; but this was done by Dr. Humphreys. It resulted in a good discussion, which occupied the whole of the remaining time till the hour for adjournment.

The proceedings on the morning of the 22nd ult. opened with the Vice-President (Mr. Rollin Norris) in the chair. The first business was the presentation of the report of the Committee on the President's Address, which was adopted. Washington was decided upon as the place for next year's meeting; and then technical matters were again to the fore. A most interesting lecture on "Gas-Engines" was delivered by Professor Alfred H. White, of the University of Michigan, who was accorded a very hearty vote of thanks. The morning's proceedings terminated with the reading of a paper by Mr. W. C. Morris, of Long Island City, entitled "Notes on the Operation of Large Carburetted Water-Gas Sets." As Mr. Morris has in his charge some huge generating machines, the total daily output of which forms no inconsiderable proportion of the supply of the Consolidated Gas Company of New York, his contribution to the proceedings was a highly interesting one. In the afternoon, the remaining contents of the "Question Box" were disposed of, and Mr. Henry L. Doherty read a paper on "Some Features of Municipal Ownership." His theme was treated with vigour and simplicity; and it raised a good discussion. This brought the technical business to a close; and after the retiring officers and the Committee of Arrangements had been thanked for their services, the proceedings terminated. A report was presented by the Committee on Electrolysis; but it will not be available for the members until the publication of the report of the meeting.

The social functions comprised a smoking concert on the first evening, the usual banquet on the second, and a steamboat trip on the third day. As usual, every attention was paid by the Entertainment Committees to the comfort of the ladies, about sixty of whom were present.

THE CORRESPONDENCE SCHOOL OF THE AMERICAN GASLIGHT ASSOCIATION.

As mentioned in the notice of the recent annual meeting of the American Gaslight Association on the opposite page, a paper on the above subject was read by Dr. A. C. Humphreys, the President of the Stevens Institute of Technology, Hoboken. As the author reviewed the results of this branch of the Association's work in the period covered by the subscriptions obtained in 1898, some extracts may be of interest, especially as since his first connection with the scheme, he has become Principal of an important educational establishment.

The Association in 1895 authorized a Committee to establish a Correspondence School of Gas Engineering. A large percentage of the membership regarded the undertaking as chimerical, or even worse, and therefore were not willing to support it, but only to withhold their opposition. By a few the scheme was actively opposed. The Committee, with the full courage of their convictions, organized and carried on the work until 1898 without pecuniary assistance. The work of instruction was performed by Mr. Walton Clark—a notable example of self-denying devotion to a sense of duty, loaded down as he was with the burdens and responsibilities of his official position. The results obtained by the Committee were, in the opinion of its members, of such a character as fully to warrant the continuing of the work by means of a more complete and permanent organization, and under the charge of a salaried executive. Those chiefly interested in the movement canvassed for subscriptions among people pecuniarily concerned in the gas business; and a sufficient amount was obtained to carry on the work for five years. With the co-operation of the Association, a permanent and independent Board of Trustees was organized to administer the funds subscribed and to direct the work of instruction. Mr. A. E. Forstall, Secretary of the Association, was appointed Secretary, Executive Officer, and Instructor.

The business management of the Trustees has been marked by care and economy; for, although there have been repeated demands made upon them to increase their expenditures, each year the expenses have been kept below the income applicable to that year, and the surplus so reserved has been carried into a special fund as the nucleus of a permanent endowment. This fund now amounts to more than $3000. The annual cost of instruction for each student has been criticized as high; but taking the total outlay as $4000, and the average number of students as 100, the result is a yearly cost of $40 per head. At the Stevens Institute, the minimum yearly tuition charge is $150 (considerably less than at some other of the engineering schools); and from the endowment there is supplied an additional $100 per annum. In other words, the full cost of tuition for each student is $250 per annum. The additional cost to each student, for books and materials, is about $50 per annum; making a total of (say) $300, or 7½ times the total cost per head in the Association's school. Moreover, all the students therein have the additional pecuniary advantage that they can continue and improve as wage-earners while pursuing their studies.

It cannot be fairly claimed that a technical education as complete as that obtainable in the best technical schools in America can be got through any correspondence school. On the other hand, it is a fact that the students of a correspondence school have fuller opportunity than do college students of carrying along together the theoretical studies and the practical application of them. The students in the Association's school possess this advantage to the fullest possible degree, for they are working in the particular business to proficiency in which their studies are directed. A most important advantage is possessed by the student who, day by day, is practically impressed with the necessity for the knowledge for which he is striving, and then in daily practice has the opportunity of applying that knowledge.

From a survey of all the questions placed before the students during the whole course, it may be thought that but little ground is covered. But there is more to influence the students than appears on the surface. To completely answer the set questions, the students must do a large amount of preparatory study, and in this work they are encouraged and intelligently directed. In studying to answer the set questions, they will learn much more by the way, and they will learn how to study and to think for themselves. While, therefore, membership in the school is to a large extent valuable, because it incites the students to, and directs them in, systematic study, that it has in my opinion also a more definite and specific value can be seen from the fact that I advise college graduates who wish to engage in the gas business to subscribe for the questions and answers, and so obtain the more closely specialized training which is necessary in every case in addition to the more general and fundamental technical training supplied by the colleges.

The graduate of a good technical school has a great advantage over the man who has only a practical training, provided the technical graduate is willing to acknowledge the value of the other man's practical training, and, acting on that knowledge, to supplement his college training by completely mastering the practical applications of theory, and the technical and commercial requirements of the particular specialty in which he is employed. This he should be able to do the more quickly and completely because of his college training. But first he must recognize the necessity for, and be willing to undertake, the drudgery to acquire this knowledge, which the colleges fail wholly or in part to supply. Here too many technical graduates fail; and so technical training is discredited in the persons of some of its professed exponents. The students of the Association's school, by reason of the conditions under which they work, are but little exposed to this danger.

There are many questions raised to-day as to the ultimate value of much of our professional training; and some of these questions are worthy of thoughtful consideration. I doubt the wisdom of turning out as many lawyers and doctors as we are yearly graduating from our colleges and universities, for the supply threatens to exceed the demand, if it has not already done so. Possibly in the not distant future, the same question may be raised with regard to the product of schools of engineering; though here it is to be considered that the training given in those schools is applicable not only to one line of work, but to the whole range of industrial effort.

Whatever questions are raised in this direction, however, there cannot be any as to the wisdom of assisting men who are already engaged in the gas business to fit themselves to more perfectly perform the work entrusted to them, and to take higher positions in that business. I hope and believe that the subscriptions now expiring will be more than renewed, and that the Trustees will thus be enabled to carry on and extend their work for another five years, and that finally an endowment of $100,000 will be secured; thus ensuring the permanency of the undertaking. If such a result should be secured, the American Gaslight Association would occupy a proud position among the world's associations of engineers.

Mr. George Mills, the representative for Scotland and the North of England of the Richmond Gas Stove and Meter Company, Limited, has no doubt already received the congratulations of the majority of his many friends on the occasion of his marriage, on Oct. 20, to Miss Mary Johnson. The ceremony took place at Reeth, Yorkshire, the home of the bride, amid great rejoicings; the village being *en fête*, and all places of business and the schools closed. There were about eighty guests present; and the happy couple were the recipients of over a hundred presents.

"Gas and Oil Engine Management" is the title of a small work by Mr. M. Powis Bale, M.Inst.Mech.E., which has just been published by Messrs. Crosby Lockwood and Son. The author intends his work to be a practical guide for engine users and attendants; and therefore its contents consist mainly of notes on the selection, construction, and management of these motors. The matter, which has to a large extent been prepared from the results of every-day practice, is presented as concisely as possible; and it is arranged in the form of paragraphs, for easy reference. Mr. Bale, being both a user and a builder of gas-engines, is competent to give good advice on the subject dealt with; and we think it will not be sought in vain in the book under notice. A chapter is devoted to rules, tables, &c.; and there is a useful index.

REGISTER OF PATENTS.

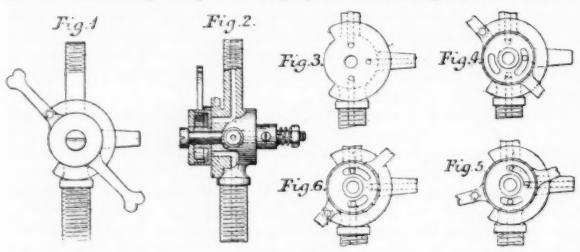
Fluid Meters.—Reynolds, W. H., of Chicago. No. 21,585; Oct. 3, 1902.

This invention in oscillating fluid meters refers to several minor details of construction—particularly with reference to means by which the change of direction of the oscillating parts is caused to be made without any sensible interval between the two movements (so that the fluid current transmitted is uninterrupted in volume or pressure), and with respect to the specific construction of the valve which controls the admission and discharge of the fluid.

Gas-Lamp Cock.—Podmore, A.E., and Thomas, J., of Hatton Garden, W.C. No. 22,816; Oct. 20, 1902.

This cock or valve is adapted to be operated by means of a lamplighter's torch so as to direct the gas first of all into a branch for igniting; then simultaneously into this branch, and also into a second branch leading to the burner; and lastly to direct the gas to the burner alone and cut off the supply to the igniting branch. Or, alternatively, the valve may be applied to two or more burners, and be adjusted to first of all direct gas to (say) one or a minority of the number of burners; then to all of the burners together; and, lastly, to a majority of the number of burners and cut off the supply to the minority.

Fig. 1 is a front elevation of the cock. Fig. 2 is a part side elevation and part central vertical section. Fig. 3 is an elevation of the body of the valve showing the ports. Fig. 4 is similar to fig. 1, but with the



valve cap or cover removed and showing the valve in the closed position. Fig. 5 shows the valve in the position in which the gas is directed to both branches simultaneously. Fig. 6 shows the valve in the position in which the gas is directed to (say) the burner only.

When the rotatable valve or body is in the closed position (fig. 4), no gas will pass from the supply duct, as its orifice is covered. If, however, the body be turned from right to left, the upper end of one of the ports will move almost up to the upper orifice; but before reaching it, and while still uncovering the side orifice, the left-hand port will uncover the lower orifice, so that gas can pass from the latter into the hollow body or valve through the right-hand port and orifice, and thence, by the right-hand duct, to the flash or climbing light, if either of these be used, or to (say) the minority of a cluster of burners if the latter application be assumed. Supposing, now, the movement of the cock body is continued, the next position arrived at is that represented in fig. 5, in which both the top and side orifices are uncovered. Consequently, gas can now pass to both of the ducts at the top and right side, and the flash or climbing light will be able to ignite the burner; or if a cluster be used, all of the burners will in this position be ignited. The body may now be turned to its extreme position (fig. 6), in which the stop comes into contact with a projection, and the side orifice is seen to be covered and the top orifice only is opened for the inlet of gas to the top duct.

An easily adjusted controlling device is thus provided, the parts of which may be readily taken apart for the purpose of grinding or treating the wearing or working faces in order to render them gas-tight.

Purifying Blast-Furnace Gas, or Combustible Gas of Analogous Character.—Thwaite, B. H., of Great George Street, Westminster. No. 24,152; Nov. 4, 1902.

This invention relates to apparatus for effecting the removal of the moisture and suspended matters in blast-furnace gases for the purpose of driving gas-engines, and relates to patents No. 8670 of 1894, No. 23,597 of 1896, No. 15,684 of 1896, No. 4225 of 1901, and No. 15,595 of 1901.

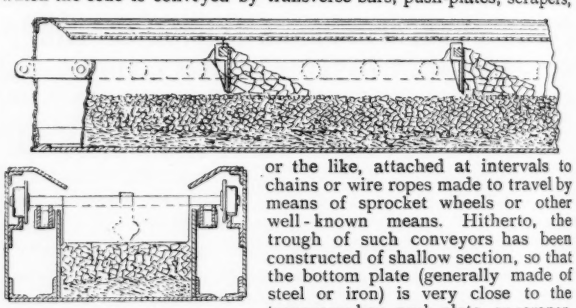
The gas is led into a box-washer of the kind described in patent No. 15,684 of 1896, but equipped with apparatus for compelling the gas to flow equally over or beneath the surface of the water in the washer, and also supplied with a constant flow of cold water, either introduced directly into the water of the bath, or through circulating pipes cast in the plates forming the bottoms, tops, sides, or partitions of the washer. The cooling water is kept in constant circulation by means of circulating or force pumps, which pass the water through cooling or refrigerating apparatus; and on to the surface of the water in the washer, tar or tar oil may be introduced, as described in patent No. 15,595 of 1901.

From the washer, the gas, partially cooled and purified, is led into a centrifugal fan working on a horizontal shaft, preferably of the compound type, with blades placed in series, and supplied with water as described in patent No. 4225 of 1901, and supplied with tar or tar oil as described in patent No. 14,771 of 1902, and equipped with a hydraulic sealed outlet as described in patent No. 4225 of 1901; so that water introduced into the fan can flow away without interfering with the operation of the fan. The fan delivers the gas, further purified, into a second fan having a vertical shaft, and equipped with annular tar and water distributing ducts and a hydraulic bath forming the hydraulic seal that permits the water to flow away, but not the gas, and allows the bath into which the deposited matter is introduced with the circulating water to be cleaned out, without involving the stopping of the fan. From the second fan, the gas passes into a governor holder; but in doing so, it has to flow through a return valve, which is operated by the movement of the gasholder. When this is raised to near its maximum altitude, the return valve is partially opened, returning the gas to the inlet of the first fan. The proportion of new gas drawn into the system is thus only that demanded by the gas-consuming apparatus, whether for heat or power production.

The "physical operations" included in the invention consist of the following: First, the subjection of the gas to the surface of water or tar, for both; the water being maintained at as low a temperature as practicable. Second, making the partially cooled and purified gas flow at a high velocity by means of the rotating blades of the fan. The latter acts as an aspirator and propeller, aspiring the gas through the apparatus in which the first "physical operation" is performed, and forcing the gas, still further purified, into a second apparatus, in which the final "physical operation" is effected. This operation consists in making the gas rotate horizontally around a central and vertical spindle at a very high velocity, or as much as 30,000 to 50,000 cubic feet per minute. One of the effects of this high-speed flow is to influence the motion of the suspended matters towards the fan side casing, down which the tar and water slowly course. The impact of the suspended particles against the tarry surface makes them adhere more or less completely, and the flow of the liquid removes them into the hydraulic bath at the base of the apparatus. As the gas is introduced into the second sphere of centrifugal influence under a pressure equivalent to that which the gas is required to possess on leaving it, the energy required to rotate the vertical spindle with its horizontal blades or discs is very little. From this second sphere of centrifugal influence, the gas is sent through a return valve into a governor pressure gasholder, which is equipped with an automatic contrivance that returns the gas to the first fan or to the apparatus in which the first physical operation is performed.

Coke-Conveyors.—Gibbons, W. P. & G. B. A., of Lower Gornal, Staffs. No. 24,570; Nov. 10, 1902.

This type of coke-conveyor is that used in gas-works where the coke, as it is discharged from the retorts, falls into a trough, or is quenched and put into a trough arranged parallel to the retort-bench, and along which the coke is conveyed by transverse bars, push-plates, scrapers,



or the like, attached at intervals to chains or wire ropes made to travel by means of sprocket wheels or other well-known means. Hitherto, the trough of such conveyors has been constructed of shallow section, so that the bottom plate (generally made of steel or iron) is very close to the transverse bar, push-plate, or scraper. With such conveyors, the bottom of the trough in course of time becomes worn—due to the friction of the coke as it is moved along; and this friction is increased, owing to the resistance of the coke wedging between the metal bottom plate and the transverse bars or scrapers. The patentees propose to overcome these defects by their invention.

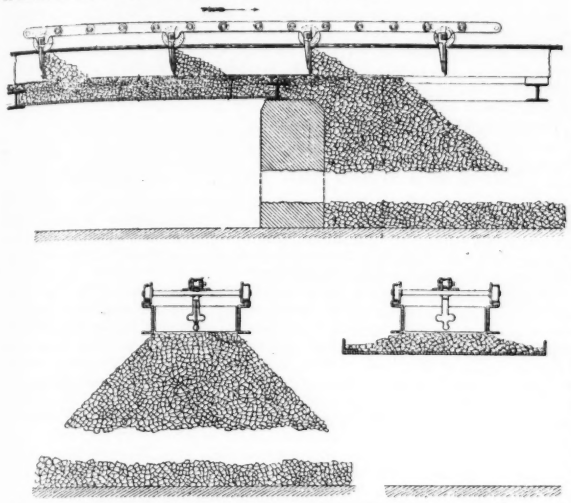
The two endless chains of the conveyor are provided with ordinary scrapers or push-plates at regular intervals apart, passing over the usual sprocket wheels at each end by which the necessary power and motion are transmitted. The push-plates are carried by ordinary cross-bars, on the ends of which are flanged rollers, which travel along tracks fixed to the outer sides of the conveyor trough; and to the tops of these sides are fixed covering plates to prevent the coke from falling on to the chains, rollers, and tracks. Generally speaking, this construction of conveyor is common; but the inventors propose to make the trough of very much deeper section than heretofore, and cover the bottom of it between the sides to a depth of several inches—say, about 6 inches—with coke or fine coke breeze in such a manner as to protect the bottom from the heat of the hot coke, and also prevent, or reduce to a minimum, the wear on the bottom due to friction. At the same time, the layer of coke dust or breeze forms an elastic path for the coke and the transverse scrapers or push-plates to travel along; so that there will be no wedging of the coke between the bottom plate of the trough and the transverse bars, scrapers, or push-plates. The coke dust or breeze in the bottom of the trough is kept wet by ordinary sprinklers, which also assist in quenching the hot coke.

Coal-Conveyors.—Gibbons, W. P. & G. B. A., of Lower Gornal, Staffs. No. 24,571; Nov. 10, 1902.

This invention has reference to scraper or push-plate conveyors used for filling coal-stores, overhead bunkers for retort settings, and for other like uses.

Hitherto, these conveyors have usually been constructed, say the patentees, with a shallow trough, along which the coal has been caused to travel by the scrapers or push-plates which travel along the trough, the bottom of which is close to, but does not touch, the lower edges of the scrapers or push-plates; and the bottom of the trough is arranged with openings at intervals through which the coal falls into the store or bunker below—the openings being closed by the coal which has fallen through them accumulating and rising up to the level of the bottom of the trough at any particular opening, or the opening has been closed by sliding or other doors covering them. There is, however, a considerable amount of wear and tear on the bottoms and sides of the trough, and also great loss of power due to the wedging of the coal between the

bottom of the trough and the scrapers or push-plates. Moreover, when the coal which has fallen through the openings in the bottom of the trough into the store or bunker below has risen up so far as to close the openings, the store or bunker is not holding so much coal as it might, because the coal underneath the openings in the trough is not level but slopes down from the sides of the opening, forming pyramids or hills of coal with valleys between them. These defects are, it is claimed, overcome by the present invention.



The patentees propose to make the troughs along which the conveyor scrapers or push-plates and the coal travels with sides only, but with no bottom—that is to say, the bottom is entirely open into the coal store or bunker, so that, as the coal is delivered by the bottomless conveyor into the coal store or bunker, it ultimately rises up to the level of the bottom of the scrapers or push-plates, and by them is slaked off and carried along and levelled, so that the top of the coal which has been delivered forms a path for the coal which is being conveyed. Thus there is no bottom to the trough to wear out, and there is no wedging of the coal, as "the coal itself which has been delivered forms, as it were, an elastic path for the travelling coal to pass over."

When the conveyor troughs are carried over roadways, or other places where the coal is not required to be deposited, this portion of the trough is made with a bottom; but the bottom is located several inches below the bottom edges of the scrapers or push-plates, so that the intervening portion will be filled with stationary small coal and form an elastic bottom for the travelling coal and scrapers or push-plates to pass over.

When the conveyor is used for stores or bunkers where it is imperative that provision be made for shutting off any portion of the coal store or bunker, the bottom of the conveyor would be made with sliding plates or hinged doors or other means for closing off the required portion of the bottom of the conveyor trough; but when so closed, these plates or doors are several inches below the path of the scrapers or push-plates, so that they will first place a layer of coal over the plates or doors (which coal will remain stationary) and then scrape the coal over the coal path thus formed to where it may be required.

Anti-Vibrators for Incandescent Gas Lighting.—Scott-Snell, C., of Victoria Street, S.W. No. 26,705; Dec. 3, 1902.

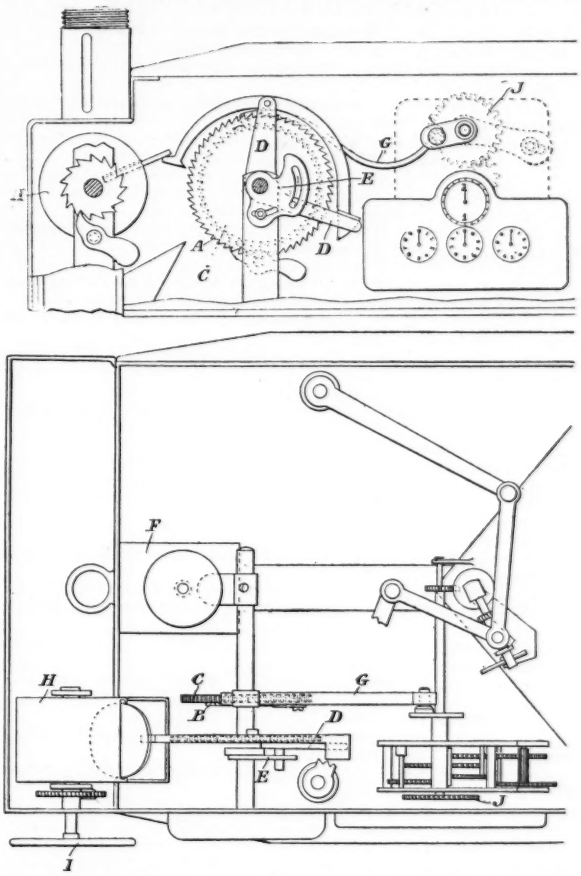
This invention consists in supporting the burner-head upon a float in a mercury vessel carried upon the burner-tube; the mercury vessel being provided with several inclined surfaces carrying balls so situated that, when the burner-tube is subjected to violent vibration, the float comes into contact with the balls and rolls them up the incline, so that the vibrations of the burner-tube are prevented from being transmitted to the mantle. It further consists in effecting the centralization of the burner-head floating on the mercury by means of one or more magnets, instead of employing the ball and incline device.

Coin-Freed Mechanism for Gas and other Fluid Meters.—Beale, B. R., of Victoria Street, S.W., and Bagnall, A. E., of Leadenhall Street, E.C. No. 18,034; Aug. 20, 1903.

The object of this invention is to construct the coin-freed mechanism for gas and other meters so that any predetermined number of coins can be inserted into them.

To the meter casing a shaft is fixed, and attached to it are two ratchet-toothed wheels A B, and also carrying a wheel C, the teeth of the wheels A C being arranged in opposite directions. Surrounding the upper edge of the wheel A is a curved arm pivoted to a bell-crank D, which is pivoted on the axle, and carries at one end a nose and tooth and at the other a weight, which finds a resting place on the free end of the bell-crank. On the axle, and adjustably connected to the bracket carrying it, is a slotted quadrant E, a pin on the bell-crank having a movement in the slot of the quadrant, so that the bell-crank and the arm are limited in their action. The wheels B C are frictionally attached to each other, and the latter wheel carries a pawl (controlled by a spring) which slips over the teeth of the wheel B when the wheels A B are being moved. On the shaft is fixed at one end a wiper, which has action on the gas-valve F to close it when the axle is rotated by the rod G pulling over the wheel C. The rod is actuated by a crank from a wheel of the index mechanism on its being operated by the meter mechanism, as is usual; the frictional grip between the two wheels being sufficient to ensure the valve closing. The other end of the axle carries a pointer, which moves over a dial, for indicating the number of coins inserted, or the amount of gas to be consumed. A coin-shoot and money-pocket are formed in a cylinder H; this being actuated by a handle I in one direction—a reverse movement being prevented by a pawl engaging the teeth of a wheel fixed on the axle of the cylinder H.

Supposing the appliance set in the position shown, and the gas-valve closed, a coin is dropped into the shoot and falls into the pocket of the cylinder H. The cylinder is revolved, and the coin presses against the

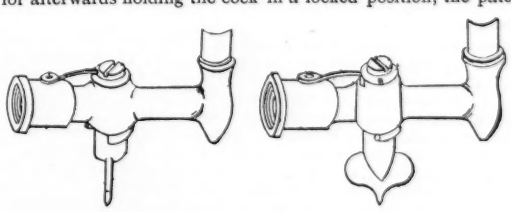


nose of the curved arm shown, and forces the tooth into action with one of the teeth of the wheel A; a further movement of the coin forcing round the wheels A B and axle until the coin leaves the nose, when it falls into the money-box, and the weighted arm returns to its normal position and leaves the wheels A B and the axle in the placed position. At the same time, the axle has been revolved to indicate on the dial that a coin has been inserted; and, simultaneously, it has removed the wiper from the gas-valve F and opened the gas supply for the meter to start action on the turning of a gas-tap. The same action takes place on the insertion of each coin up to (say) twelve, by which time the wiper has reached the end of its travel, and the appliances cannot be moved by the coins any further.

The gas supply being established, and the gas consumed, the bellows (through the usual mechanism) operates the index mechanism. In this, there is provided a wheel J – preferably the change-wheel described in patent No. 8820 of 1901; and to this wheel is fitted a crank which carries a rod having a catch tooth at its free end. This tooth slides over the teeth of the wheel C when the crank is travelling in one direction; but on the crank's return journey, the tooth of the rod engages the teeth of the wheel C, and revolves it, and, by the frictional contact of the two wheels B C, also revolves the axle. In consequence of this, the wiper is moved to close the gas-valve F; the crank continuing its action until the valve is completely closed, when a fresh insertion of coins re-opens the valve.

A Locking Gas-Cock.—Martin, F. S, of South Sioux City, Neb., U.S.A. No. 19,000; Sept. 3, 1903. Date claimed under International Convention, Sept. 3, 1902.

In order to provide means for ensuring a complete shut-off of gas, and for afterwards holding the cock in a locked position, the patentee



proposes to combine with the body, barrel, and plug of the cock (the barrel having a notch in the end) a notched washer carried by the plug, and a spring latch secured to the body, engaging the notch in

the washer so as to lock the plug against rotation when the gas is turned off, and which is held within the notch in the barrel by the washer when the gas is turned on. The notch in the inner face of the plug registers with the notch in the barrel when the gas is turned off. The spring latch is at one end attached to the body; while the other end projects between the end of the barrel and the washer into the notches.

APPLICATIONS FOR LETTERS PATENT.

22,512.—Hall, W., "Street and similar lamps." Oct. 19.
22,531.—Fuchs, J., "Internal combustion engines." Oct. 19.
22,540.—Elliott, W. A., "Supplying calcium carbide into generators." Oct. 19.
22,546.—Hertzog, L., "Recovery of heat from gases produced from solid combustibles." Oct. 19.
22,547.—Hertzog, L., "Producing power gas." Oct. 19.
22,549.—Gardner, R. W., "Gas heating-stove." Oct. 19.
22,561-2.—Helmann, H. W., Arendt, O., and Marcuse, J., "Downwardly burning incandescent lamps." Oct. 19.
22,586.—Cox, J., "Incandescent gas lighting." Oct. 20.
22,603.—Burley, J. D. C., and Gilmore, A. E., "Anti-vibration fittings for incandescent gas-burners." Oct. 20.
22,612.—Boe, W. R., "Incandescent gas-burner." Oct. 20.
22,671.—Thompson, W. P., "Radiators for gas-stoves." A communication from the Duplex Radiator Company. Oct. 20.
22,748.—Brown, A. O., and Downie, C. M., "Gas lighting for street or other lamps." Oct. 21.
22,759.—Conradi, C. G., "Internal combustion engines of the rotary type." Oct. 21.
22,784.—Reuter, T., "Steam and gas turbines." Oct. 21.
22,829.—Gillie, W. S., "Pressure-raising apparatus for gas." Oct. 22.
22,831.—Crossley, W. J., Atkinson, J., and Webb, W. le P., "Internal combustion engines." Oct. 22.
22,853.—Beal, W., "Inverted incandescent gas-burners." Oct. 22.
22,866.—Nichols, E. I., Huntington, F. A,, and Hawes, B. C., "Steam or gas generators." Oct. 22.
22,886.—Reiss, C., "Gas-burners." Oct. 22.
22,900.—Calvert, J. C., "Valves for controlling the flow of fluids under pressure." Oct. 22.
22,946.—Deegen, A., "Gas-retort furnace." Oct. 23.
22,994.—Funcke, W., "Lighting street incandescent gas-lamps." Oct. 23.
23,008.—Bollé, C., "Retort-charging apparatus." A communication from C. Eitle. Oct. 24.
23,045.—Good, R., and Spencer, S., "Purification of coal-gas." Oct. 24.
23,05 ,.—The Tubular Bath-Boiler Company, Ltd., and Bushell, W. H., "Gas range or kitchener." Oct. 24
24,164.—Sutherland, J. W., "A rotary sprayer for use in gas-condensers." Oct. 26.
23,213.—Bond, J. P., "Treating gas lime." Oct. 27.
23,217.—Keith, J. & G., "Gas supply apparatus for yarn gassing frames." Oct. 27.
23,223.—Crossley, W. J., and Coster, A. V., "Internal combustion motors." Oct. 27.
23,293.—Fersenheim, R. L., "Prepayment gas-meters." Oct. 27.
23,341.—Boelen, H. J. H., "Automatic gas-lighting device." Oct. 28.
23,395.—Cutler, S., "Charging device for gas-retort furnaces." Oct. 28.
23,415.—Reading, H. C., "Generating an expansive pressure in a receiver, direct from gas, or anything of a similar nature." Oct. 29.
23,429.—Hislop, G. R., "Gas-fired furnaces." Oct. 29.
23,468.—Downey, E., "Gas tip and burner." Oct. 29.
23,500.—Brown, J. M., "Open-air gas-lamps." Oct. 30.
23,548.—Jones, W. C., and Smith, T. B., "Flexible-tube gas-pendants." Oct. 30.
23,556.—Woodall, H. W., and Duckham, A. M'D., "Manufacture of gas." Oct. 30.
23,565.—Pearson, C. R., "Wet gas-meters." Oct. 30.
23,616.—Heenan, H., "Manufacture of crude gas from coal or other material." Oct. 31.
23,629.—Beck, C. W., "Acetylene gas-generators." Oct. 31.
23,635.—Duncan, H. E., "Gas-producers." Oct. 31.
23,662.—Meinecke, C., "Water-meters." Oct. 31.

Decreased Leakage at Ripon.—It is stated that during the past half year the leakage of gas at Ripon has been reduced from 28·12 to 17·75 per cent. While the total make showed a decrease of 2,500,000 cubic feet, as compared with the corresponding period of last year, the quantity sold or accounted for was more by 391,249 feet. With an increase in the make from 8525 to 10,566 cubic feet per ton, the illuminating power of the gas was maintained. When these figures were placed before the members of the City Council last week, the opinion was expressed that they reflected creditably on, Mr. W. T. Lancaster, the Gas Manager.

Woodbridge District Water Company.—The third ordinary meeting of this Company was held on the 28th ult.—Mr. H. Blomfield in the chair. The Directors reported that the works, of which a description was given in the "Journal" for the 13th ult. (p. 113), were practically complete, and it was expected that they would be in a position to supply water early this month. They had been carried out in a most efficient way under the direction of the Engineer (Mr. A. F. Phillips, M.Inst.C.E.), and the immediate supervision of Mr. H. Preece James, the local Clerk of the Works. The Chairman, in moving the adoption of the report, reviewed the progress of the Company, and said he thought the shareholders had good reason to be satisfied with the position and prospects of the undertaking. The report and accounts were adopted. At a subsequent special meeting, authority was given to raise £3000 by the issue of 4 per cent. debenture stock.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Gas Acts for 1903.

Sir,—I have read with interest Mr. J. Ferguson Bell's letter, given in this week's "Journal." It is quite evident he has not tried—nor for that matter have the advisers he refers to also—to carry out to the letter clauses 54*a* to *d*. I will add further that under the conditions laid down in the Derby Gas Act, 13-candle gas cannot be tested, far less 14-candle Derby gas.

Nov. 7, 1903. Critic.

Output of a Works with Ten-Inch Connections.

Sir,—In your issue of Oct. 6, "Manager" asks what is the possible yearly output of a gas-works with 10-inch connections. Three years ago, with an output of 30 millions, this Company decided to double the size of the plant; and the writer looked up all the known authorities on the subject for guidance on the matter.

Finding nothing reliable, he decided to put in a 10-inch works, and use in their construction all the old material possible, and set them in the following order: (1) Four benches of six retorts each; retorts 16 inches by 26 inches by 9 feet. (2) One tar extractor. (3) Two condensers, each 26 feet high, 4 feet in diameter. (4) Two exhausters in duplicate. (5) Three cylinders, 4 feet in diameter, 27 feet high, set vertical; used for removing naphthalene from the gas (and they do it). (6) One condenser, 20 feet high, 8 feet in diameter. (7) One washer, 30 feet high, and 6 feet in diameter. (8) One set of four purifiers, each 8 feet by 10 feet, set on an 8-inch centre-seal. (9) Two purifiers, each 16 feet by 18 feet; the six purifiers connected so that they may be operated as one or two sets. (10) Three station meters with a rated capacity of 24,000 cubic feet per hour. (11) Three gasholders, capacity 20,000, 60,000, and 210,000 cubic feet—total 290,000 cubic feet. (12) Two 6-feet water-gas machines, connected to the 20,000 feet relief holder. This relief holder discharges either into the hydraulic main or between the tar-extractor and exhauster.

Now as to the output. In 1902, our make was 56 million cubic feet; in 1903, it will approximate 65 millions. On Oct. 6, 1903, without any special effort, we made 18,000 cubic feet per hour for five or six hours, or at the rate of 432,000 cubic feet per day, and an increase of 3 inches over the holder pressure. I consider the works safe for an output of 125 millions yearly.

S. M. Highlands.

Clinton (Iowa) Gas Company, U.S.A., Oct. 24, 1903.

The Advantages of Profit-Sharing and Co-Partnership.

Sir,—In your "Editorial Notes" in this week's Journal, headed "Some Reflections on Workmen's Characters," you say: "Whosoever thinks of sowing a seed of thrift, or of inaugurating a higher culture, must first bethink him of the nature of the soil, or of the raw material which he has to work upon." This remark and another about "the worthlessness of the material" seem to imply that it is no use trying to benefit workmen by profit-sharing or co-partnership methods unless they are thriftily inclined. If this is the meaning, then I must join issue; for such an idea is likely to suppress all efforts in the direction you have so constantly and earnestly advocated.

Nothing in connection with our work has so surprised me as the large proportion of men who, as soon as the opportunity offered for practising thrift, availed themselves of it. I do not think anyone would have expected that more than a small percentage of workmen would have voluntarily saved their annual bonuses. That nearly one-half should have done so from the first was a most surprising result; and, better still, the proportion of thrifty men has steadily increased, until nearly all the employees of the South Metropolitan and Crystal Palace District Gas Companies now save the whole of their bonuses, while there is reason for expecting the same with the Commercial Gas Company, whose first bonus was only declared in July, 1902. If, in these cases, we had first bethought ourselves of the nature of the raw material, which is very varied in character and training, I much doubt whether anything would have been attempted. It would have been another exemplification of the proverb, "Faint heart ne'er won fair lady."

Of course, there are some workmen (as there are men in all ranks of life) with whom nothing can be done; but no man can identify these hopeless cases beforehand or until trial has been made and the opportunity put in their way. Therefore, let trial be made; for thus only can the nature of the raw material be ascertained.

My experience has shown me that it is a libel on British workmen to say they are thriftless—that is, if opportunity and some reasonable encouragement be given them. One reason why so few practise thrift is the feeling that it is no use trying to save. Replace hopelessness with hope, and a great and beneficial change results. And another extremely satisfactory change takes place in the feeling and bearing of the men towards their employers—a genuine manifestation of friendliness and goodwill which was totally absent previously to the introduction of profit-sharing or co-partnership, as it may be more suitably described.

This pleasant surprise was particularly noticed by the officers of the Commercial Company, which is only a repetition of the experience in the other cases. It alone goes a long distance—if not all the way, as I believe—towards paying all the co-partnership bonus. Moreover, it is a certain considerable (although unmeasurable) money gain to the five Companies—viz., the three in London and at Chester and Newport—that the management is relieved from all anxiety about the workmen. I can say that, during the fourteen years the system has been in operation with the South Metropolitan and the nine years with

the Crystal Palace District Company, there has never been any difficulty or the slightest anxiety in connection with the workmen. This alone is a very strong argument in favour of, and a sufficient reason for, the adoption of the system.

Still further, is it not a great thing, both for the workmen and for the country, to lift them from their ordinary helpless, hopeless, and dependent position into one of healthy and happy independence (comparative, of course), to remove them from the class of "have nots" into "haves"—in short, to convert them into property-owners, and thus completely change for the good their position as responsible citizens? All this and much more follows upon thrift. Surely great responsibility rests on employers generally, and particularly on gas companies, to whom the way has been made clear, if they fail to aid in this movement to whom its applicability and its advantages have been proved.

Will not other Chairmen do as Mr. Bradshaw (of the Commercial) and Mr. Gamon (of Chester) have done, or other Gas Engineers and Managers follow the example of Mr. Canning, of Newport, in this matter? If so, they will have their reward in the welfare both of the company and its employees of all ranks; for the system extends to all officers and workmen.

I am confident that the bad conduct of the Glasgow workmen mentioned in your "Editorial Notes" is due much more to the system than to the men; and I have no doubt that a large proportion of these very men, if they could be imported into one of the co-partnership gas-works, would respond to good influences like their fellow-workmen. The Glasgow experience is simply another proof of the failure of the wage-hire system, and it only emphasizes the necessity for a change which employers only can initiate in the relations of Capital and Labour. Mazzini said the labourer was first a slave, next a serf, then working for wage-hire, and his position must be finally that of partner. Partnership in some form is, I fully believe, the true solution of this great problem. Would that the gas companies would take the lead in the movement, and thus add one more to the great, but inadequately appreciated, services they have rendered to the community.

The "JOURNAL" has given so many proofs of sympathy by its continuous advocacy of the principle, that I am sure it is farthest from the wish of the Editor to say anything to hinder its adoption. I feel sure it was not intended to convey any adverse impression. The Sower in the Parable, however, to whom you referred, sowed his seed everywhere—by the wayside, in stony places, among thorns, and in good ground, where it brought forth variously—some thirty, some sixty, some a hundredfold. We must sow if we are to reap, and even what appear to us unpromising places may yield a fine harvest.

GEORGE LIVESEY.

Nov. 7, 1903.

The Competition between English and Continental Cements.

SIR,—A few weeks ago you published a letter from me, in which I called attention to the apparent inability of our cement-makers to compete successfully in open markets abroad. As you have referred to the question of cement manufacture as one that concerns the £ *s. d.* of the gas industry, I offer no apology for asking you to allow me to make known through your columns some further information on the subject, which may be new to some of your readers.

(1) Mr. Alfred Brooks, a Director of the Associated Portland Cement Manufacturers, stated last session before the Select Committee on the Port of London Bill, that the cement industry was suffering from very keen competition, as evidenced by the very large increase of the imports of foreign cement into London during the past three years. Practically, no cement was brought to London prior to 1900, when 3762 tons were imported. In 1901, the quantity had grown to 12,300 tons; in 1902, to 14,891 tons; and in the first four months of the present year 5500 tons had been brought in. Most of the cement came from Belgium and Hamburg; and the experience had been the same throughout the United Kingdom. Excluding London, the imports first reached serious dimensions in 1898, when they amounted to 91,000 tons. In 1899, they had increased to 123,000 tons. In 1900, they fell to 104,000 tons, but rose again in 1901 to 220,000 tons—increasing last year to 240,000 tons. The margin of profit had now got so close that a difference of 6d. per ton would carry a contract to the foreigner, and they had been completely driven out of the Glasgow market, which last year used almost exclusively imported cement.

This state of affairs was not due, as suggested, to the combination entered into in 1900. This combination was formed, not to keep up prices, but to introduce economies in manufacture. It was partly due to the slump in Germany, in consequence of over-production, which led the German manufacturers to "dump" their cement in England.

(2) At the last general meeting of the shareholders of the Associated Portland Cement Manufacturers (1900), the Chairman, Mr. F. A. White, is reported to have said that "the competition which the Trust continued to meet was still two-fold—it existed at home and abroad. In this country, the competition continued to be very much what it had been; but the prejudice against the Company for being a Trust was dying out. But far worse than the competition of English manufacturers was that from the Continent; and the question might not unreasonably be asked, Why was it that, with chalk and clay at our doors, and with the best of waterways, we were being beaten by Germany and Belgium, not only in distant markets, but also round our own coasts. The answer might be that there must be some inferiority in our processes of manufacture or some slackness of effort. But he did not think that any slackness on the part of the sales directors or of process of production lay at the root of the matter. Belgium rather than Germany was the Trust's principal rival; and in that country what was known as natural cement was largely produced. The condition of the labour market on the Continent was also a very considerable factor; for during a recent visit to some cement works in Belgium, he found that the price paid there for unskilled labour was about 2½d. an hour, whereas in England they had, very properly, to pay more than double that rate. Yet another feature was the favourable freight rates which Continental manufacturers could secure, and which, in effect, created a bounty to the foreign producer. He was anxious to avoid any political allusions; but he could not help saying that *if the wisdom and statesmanship of the country should declare that some duties on some manufactures should be levied, cement was an article that would have to be included.*" [The italics are mine.]

(3) The following is a copy of a recently received letter from a friend who has been using cement largely during the last few years in the construction of important public works: "I now have pleasure in handing you a tabulated statement setting forth the dates when we bought portland cement. You will then see that both the German and the Denmark cement was superior to the Rochester make, of which we used a very large quantity. I cannot speak of the English cement since the end of 1900, as since then we have used Continental cement almost entirely. It is quite possible that the English manufacturers have since improved their plant; but up to that date the character of their grinding was decidedly inferior to the character of the Continental product—so much so, in fact, that we found we could use one measure of cement less and produce the same quality of concrete when mixed in the machine as when using the English cement, which was more coarsely ground. We have used this Continental cement very largely both below and above ground; and in all cases where it is remaining exposed it is proving to be of an eminently satisfactory quality both in the laying of floors and the paving of yards with rough concrete, and in the formation of retaining walls and the casting of concrete blocks which form the base for cast-iron columns and other supports."

I shall be very pleased to show to anyone interested in the subject the tabulated statement of prices so referred to by my correspondent.

15, Victoria Street, S.W., Nov. 6, 1903. CHAS. HUNT.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Friday, Nov. 6.

(*Before Mr. Justice* CHANNELL, *without a Jury.*)

Kitson Lighting Company of Great Britain v. Arthur Kitson.

This was an action by the above-named Company against Mr. Arthur Kitson, late the Managing-Director, claiming a sum of upwards of £1000 as balance of an account for goods; while the defendant counter-claimed for certain disbursements he had made on behalf of the Company, as well as a large sum for damages for wrongful dismissal—he having an agreement with the Company to hold the position of Managing-Director for three years at a salary of £1000 a year, and having, as he alleged, been wrongfully dismissed 19 months before the expiration of the term.

Mr. RUFUS ISAACS, K.C., and Mr. BRAY appeared for the plaintiffs; Mr. DICKENS, K.C., and Mr. DISTURNAL represented defendant.

Mr. RUFUS ISAACS, in opening the case, said the pleadings and particulars on both sides were very voluminous; and, in order to save time and expense, certain figures had been agreed upon between his learned friend and himself, the result of which was that the defendant would submit to judgment for £882 16s. 6d., subject to anything he could show he was entitled to as damages for wrongful dismissal. An arrangement had been made as to the costs of all but that issue. His Lordship would therefore simply have to decide that question only; and, of course, his friend would have to open and prove his case. He might, however, state how the question arose, and explain the plaintiffs' position with regard to it. By the Articles of Association of the Company, it was provided that if a Director was appointed Managing-Director, and should, from any cause, cease to be a Director, he should *ipso facto* cease to be Managing-Director. Another Article provided that a Director should cease to hold office in certain contingencies; one being in the event of all the other Directors giving him notice in writing that they desired him to resign. As the result of certain difficulties which had arisen, this was done in the present case in January last, and Mr. Arthur Kitson applied to Mr. Justice Farwell in February for an injunction, but was unsuccessful; his Lordship holding that the agreement was subject to the Articles. He should submit that, in substance, this decided the present question; but, in addition, he should also contend that the conduct of Mr. Kitson had been such, in refusing to act in accordance with the instructions of the Board, that they were justified in dismissing him.

Mr. DICKENS then opened the case for Mr. Kitson, and submitted that neither on the question of law, nor on the facts, were the plaintiffs justified in dismissing him, and that Mr. Justice Farwell's judgment did not affect his claim for damages.

Evidence having been given by Mr. *Kitson* on his own behalf, and by Messrs. *Todd* and *Back* and Sir *Ralph Knox*, for the Company,

A long argument by Mr. RUFUS ISAACS and Mr. BRAY ensued.

Justice CHANNELL gave judgment to the effect that the power of the Directors to get rid of the defendant as Managing-Director by calling upon him, under the Articles of Association, to resign his office of Director, did not relieve the Company from liability to pay damages for breach of the agreement. It was analagous to the ordinary case of a person summarily dismissing a servant. The servant could not get an injunction to prevent his dismissal, but he could claim damages if dismissed without sufficient cause and without due notice. His Lordship then went through the evidence, and came to the conclusion, on the facts, that there was nothing to justify the dismissal, and that Mr. Kitson was entitled to damages. As to the amount, he could not give him the full 19 months' salary, as he was a professional man, carrying on business, and his time was, of course, valuable to him. But he thought, on the whole, it would be fair to award him half the salary, £790. He was also entitled to the costs of the counter-claim, on which he had succeeded.

Mr. DISTURNAL said they would pay over the balance of the £882 to which the plaintiffs were entitled, and suggested that if the other side wished to appeal, the taxation of all the costs should be deferred.

Justice CHANNELL said this would be a reasonable arrangement.

COURT OF SESSION.—Tuesday, Oct. 27.

(*Before Lord* PEARSON.)

Coatbridge and Airdrie Gas Supply.

Lord Pearson to-day closed the record in an action against the Coatbridge Gas Company by certain persons who seek declarator that the Company are not entitled, and that it is *ultra vires* for them, to supply with gas any portion of the burgh of Airdrie. They also ask for an interdict of such supply. The pursuers state that they are shareholders both in the Coatbridge Gas Company and the Airdrie Gaslight Company. The burgh of Coatbridge, for a considerable portion of its eastern boundary, marches with the western boundary of the burgh of Airdrie; the part of the burgh of Airdrie which immediately adjoins Coatbridge being known as Coatdyke. The burgh of Coatbridge is in the parish of Old Monkland; that of Airdrie is in the parish of New Monkland. In 1843, a Company (known as the Coatbridge Gaslight Company) was formed, with the object, as stated in the Momorandum and Articles of Association, "of carrying on works for manufacturing and supplying, and lighting with gas, all or any of the streets and other places, and also all buildings within the town of Coatbridge and adjacent villages in the parish of Old Monkland and County of Lanark." The Coatbridge Company were incorporated by Act of Parliament in 1877. Section 4 of the statute provided that "the limits of this Act shall be the town of Coatbridge and the suburbs thereof, and places within the parishes of Old Monkland, Cadder, New Monkland, and Bothwell, all in the County of Lanark." In the year 1830, the Airdrie Gaslight Company was incorporated, for the purpose of lighting the town of Airdrie with gas, and subsequently a new Memorandum and Articles of Association were framed which provided for the Company supplying gas to "the town of Airdrie and other places adjacent, and adjacent villages in the parishes of New Monkland, Old Monkland, Bothwell, and Shotts, all in the County of Lanark." From the time of its formation, the Airdrie Gaslight Company have supplied with gas the whole of the town of Airdrie. In the beginning of 1903, negotiations were in progress between the Airdrie Gas Company and the Town Council of Airdrie, which involved the purchase by the Town Council of the Company's undertaking. By a letter, dated Feb. 7 last, addressed by the Secretary of the Coatbridge Company to the Town Clerk of Airdrie, the defenders objected to such a proposal being carried through, on the ground that since the burgh of Airdrie fell within the territory assigned to them by Act of Parliament, the Town Council were prevented, under the Burghs Gas Supply (Scotland) Act, 1876, section 2, from entering upon such an undertaking. Further correspondence took place on the subject, in the course of which the defenders maintained their right to supply Airdrie with gas, and stated that they were making arrangements for extending their mains into the burgh. It is believed that they have applied to the Town Council for permission to open the streets for this purpose. In consequence of the action taken by the defenders, the pursuers, through the Town Clerk, on April 17 intimated that they protested against the defenders' proposal to supply the burgh of Airdrie with gas, as being *ultra vires* of the defenders. Notwithstanding this protest, Mr. Wilson, the Secretary of the Coatbridge Company, on June 19, by a letter addressed to the Town Clerk of Airdrie, intimated that his Directors proposed to supply with gas the Airdrie Model Lodging House, which is situated within the burgh of Airdrie, and that they were carrying on negotiations for this purpose.

The defenders say that the pursuers are all Directors of the Airdrie Gaslight Company. The two burghs have only marched with each other since the year 1885. In that year, Coatbridge was, for the first time, constituted a burgh, and the burgh of Airdrie, was extended so as to include the districts of Rochrolloch and Coatdyke. The powers conferred upon the defenders by their Act of 1877 authorized all the contemplated operations of the defenders. They at present supply gas within the extended burgh of Airdrie. They have not yet applied for permission to open streets in Airdrie, for the purpose of extending their supply; but they contemplate doing so when necessary. The burgh of Airdrie falls within the statutory sphere of the defenders' operations—lying as it does within the parish of New Monkland and adjacent to Coatbridge. Neither the town of Airdrie nor the Airdrie Gaslight Company possesses parliamentary powers. The town of Airdrie, marching with Coatbridge, is peculiarly well adapted for receiving gas from Coatbridge, as it lies at a higher elevation. The defenders' Company already supply gas within the district of Rochrolloch; and the defenders' main pipes are within a few yards of that district, and of the district of Coatdyke. A considerable number of the inhabitants of these districts have applied to the defenders for a supply of gas. The price of the defenders' gas is very much lower than that supplied by the Airdrie Company. The present charge in Coatbridge is 2s. 2d. per 1000 cubic feet; whereas the charge made by the Airdrie Company was, until recently, 3s. 4d., and is still 2s. 11d. per 1000 cubic feet. The letters from the defenders were not meant to be unfriendly to the Airdrie Gas Company, but were written with the intention of preserving the defenders' statutory rights, which are, in their opinion, of considerable value.

CLERKENWELL POLICE COURT.—Tuesday, Oct. 20.

(*Before Mr.* BROS.)

Repair of Roads after Main-Laying.

To-day, the New River Company were summoned, under the Metropolitan Local Management Acts, 1855 and 1862, for neglecting to pay the Corporation of Westminster the sum of £89 9s. 8d., due for expenses incurred in filling in, making good, and maintaining the pavement in streets opened by the Company.

Mr. MORTON SMITH appeared for the Westminster City Council; Mr. COURTHOPE-MUNROE and Mr. LANGSTON for the respondents.

Mr. SMITH explained that the dispute had arisen as to the charges made by the Council upon the Water Companies with respect to the breaking up of the streets. They had revised these charges, and decided to add to them 10 per cent. for "supervision" in lieu of the Companies making good any subsidence which took place within twelve months after the completion of the work, which subsidence always happened. In support of this statement, he mentioned that the Company executed some work extending from the Horse Guards Avenue in Grosvenor Road in 1902, in which subsidence occurred, after completion, along nearly the whole of the course. The 10 per cent. covered the work in some instances but not in others.

Mr. COURTHOPE-MUNROE, replying to the Magistrate, said the respondents objected to the Council's charges because they were from 25 to 30 per cent. in excess of those made by other Councils. It did not seem right that for the same piece of work they should have to pay higher in Westminster than they did in Kensington.

Mr. *J. W. Bradley*, the Engineer to the City of Westminster, gave evidence in detail as to the charges of the Corporation. He said the expenditure in this department averaged £20,000 per annum. They had to employ a staff to supervise the work, which was often done in sections at a distance from each other. Then they were responsible for accidents occurring after the Companies had settled the Council's claims, owing to subsidence.

In cross-examination, witness said he could not explain why his Council paid 2s. 3d. per foot to the contractors, as against 1s. 6d. paid by other local authorities and 1s. 9d. paid by the City of London. They accepted the lowest tender.

Tuesday, Nov. 3.

The further hearing of the case took place to-day.

Mr. COURTHOPE-MUNROE asked his Worship to consider whether there was any law which enabled the Council to make a charge for "superintendence;" and, if so, what was the proper charge. He contended that the Company were only liable for the actual out-of-pocket expenses of the Council.

Mr. SMITH contended that all the expenses to which the Council were put in connection with their responsibility for superintending the work of the Company, could fairly be charged. They were entitled to complete indemnity.

Mr. BROS said he would at once deal with the point of law. The practice had been for the Water Company to open the pavement and fill in, and for the Council to take the responsibility for repaving. They had for this charged the contract price, *plus* an average for "keeping-up repairs." He held, however, that they were only entitled to charge for expenditure actually incurred, and could not add a charge based on averages. That could only be done by agreement. But it was to the interest of both parties that the work should be properly carried out; and therefore 10 per cent. had been added as in the nature of surveyor's expenses. Whether or not 10 per cent. was the right figure, he could not say; but certainly something should be charged for this superintendence or "supervision."

Mr. SMITH expressed himself as satisfied with this decision.

Mr. COURTHOPE-MUNROE, on the other hand, asked for a case on the question of supervision charges.

The summons was adjourned pending the decision in the stated case.

Question as to the "Sunlight" Acetylene Gas Patent.

In the Chancery Division of the High Court of Justice for Ireland on Thursday, the Master of the Rolls (the Right Hon. Sir Andrew Marshall Porter, Bart.) disposed of a question which had been raised in connection with the "Sunlight" acetylene gas patent. Application had been made by Mr. T. H. Walker, a chemist of Kingstown, and the owner of a patent granted in 1898 (No. 4352) for an improved process and apparatus for the simultaneous production of acetylene and carbonic acid gas, and for the purification of same, to restrain the "Sunlight" Gas Company from infringing it, and also for damages. The defendants denied infringement, and stated that the patent was invalid, owing to the invention having been anticipated by what was known as Goodwin's patent (No. 17,644, of 1896), which was for a plant and system to produce acetylene gas, of which the defendants were the assignees; and plaintiff's alleged invention was no improvement upon it. The Master of the Rolls said that, on comparing the applicant's specification with Goodwin's, he could not see that there was any material difference between them. He must hold, however, that there was no new invention by the plaintiff, and consequently no infringement on the part of the defendants. The injunction would therefore be refused.

Claims for Water-Rents of Cottages.

At the Crediton County Court, some weeks ago, before his Honour Judge Lush Wilson, actions were brought by the Crediton Urban District Council to recover, from William Arundel, John Gregory, and John Weeks, sums amounting to £1 17s. 6d., £2 18s., and £4 5s. 6d. respectively, for water-rents for cottages of which they are the owners. Mr. Tarbet, for the Council, said the cases involved the right of that body to claim water-rents from owners of cottage property of less value than £10 per annum. Mr. A. E. Dunn, who represented the defendants, said that a portion of the claims were seven or eight years old, and therefore the Council could not recover. Under the Public Health Act, 1875, the jurisdiction of the County Court was similar to that of a Court of Summary Jurisdiction, and the action should have been brought within six months of the demand. Mr. Dunn also quoted sections of the Water-Works Clauses Acts, 1847 and 1863, and contended that the amount claimed in each case being a rent, and not a rate, it was not recoverable. Mr. Tarbet maintained that the County Court judge had jurisdiction, and that under the Statute of Limitations the Council had power to claim rates for six years. Evidence was given by the collector that the rent had been demanded from the owners, who refused to pay on the ground that

they had agreements with the tenants. Prior to 1895, the tenants used to pay. His Honour said the case was not absolutely clear; and therefore he would consider his decision. This he gave at the sitting of the Court last Wednesday. He said the defendants did not dispute the fairness of the rent claimed; but, by virtue of their agreement with the tenants, they looked for the latter to pay or indemnify them. It followed that there was sufficient evidence of an agreement to pay the rent claimed. As the net annual rateable value of each of the cottages was less than £10, the owners of the cottages instead of the occupiers were liable to the payment of rates. Therefore there must be judgment for the plaintiffs for the amount of their claim during the six years immediately preceding the commencement of proceedings, with costs.

Claim in Respect of Gas for a Balloon.

At the Clerkenwell County Court, a few days ago, before his Honour Judge Edge, Mr. C. S. Spear, of 200, Great Brunswick Street, Dublin, the proprietor of the Newbridge Gas-Works in Ireland, sued Messrs. Spencer Bros, aëronauts, of Aberdeen Park, Highbury, for £10, as damages for breach of contract. Mr. Saunt appeared for the plaintiff; Mr. Coltman represented the defendants. The plaintiff's case was that, as the result of negotiations, he undertook to inflate with gas a balloon to contain a party desirous of witnessing the great motor-car race on the 1st of July. The quantity of gas required was 21,000 cubic feet; and it was to be charged for at the rate of 6s. 8d. per 1000 feet. He made the necessary preparations for producing this bulk of gas, which was unusually large for the summer time; but on the 18th of June the defendants informed him that, owing to certain difficulties concerning the site, he need not do anything more in the matter. They offered him £1 by way of compensation for the trouble and expense he had incurred; but he declined to accept it, and demanded £10. Plaintiff sent in particulars of his claim, as follows: Compensation for breach of contract, £5; sundry expenses in arranging details, £3; cost of connections, £1 10s.; telegrams, postage, &c., 10s. Examined by Mr. Saunt, he said his two holders would only contain 15,000 cubic feet of gas, and therefore he would have to make the other 6000 cubic feet in the shortest possible time. In view of this, he kept fires going which otherwise he would have let out. Had he completed the contract, the whole amount received for the gas would have been £7; while the labour and expenses would have come to £5 or £6. He would not have made anything out of the job; but he did not mind this in view of the object. Mr. Coltman, in cross-examination, pressed plaintiff for more details as to his loss, especially as to the keeping up of the fires. Mr. Percival Spencer, the Manager of the defendant firm, said the plaintiff's offer was accepted subject to the site being satisfactory; and upon inspection this was found not to be the case. His Honour remarked that the secret of the whole business appeared to him to be that the defendants wanted to be nearer the track. Mr. Coltman urged that they would not be likely to give a definite order before knowing whether or not a field was obtainable in which to lay the balloon for inflation. He characterized the whole claim as a most unreasonable one. His Honour said he was perfectly satisfied that a binding contract had been made between the parties; and he should hold the defendants liable for its breach. At the same time he considered the claim was excessive, as the work done was only preparatory. Under all the circumstances, he thought the justice of the case would be met by awarding the plaintiff £8 8s. and costs.

Gas-Works Purchase Question at Appleby.—The Appleby Town Council, at a special meeting, have unanimously decided to carry out a recommendation of the Sanitary and General Purposes Committee that a Bill should be promoted in the next session of Parliament to enable the Corporation to acquire the undertaking of the Appleby Gas Company.

Kidderminster Water Scheme Sanctioned.—After a long delay (the inquiry having taken place six months ago—see "JOURNAL" for March 31, p. 849), the Local Government Board have sanctioned the proposal of the Kidderminster Town Council to borrow £18,000 for the extension of their water-works; but they have decided that a sum of £900, which has been already spent, shall be paid for out of the rates, and not form part of the loan. It may be remembered that the question excited great interest and much opposition; and that the proposal was carried by a majority of only two in the Council.

Electric Light Displaced by Incandescent Gas at Hull.—In the course of the proceedings at a meeting of a Ratepayers' Association at Hull held last Tuesday, the subject of the cost of the electric light was under consideration. The Chairman (Mr. W. H. Raine) said that he thought the price ought to be reduced; and he suggested that a reduction could be effected if the general public were encouraged to use the current during the daytime. Mr. W. G. Smith said his firm had replaced the electric light by incandescent gas, with the result that they had an improved light and saved £40 a year. He moved a resolution that the Association should send a deputation with one from another ward to the Chamber of Trades, and support them in their endeavour to induce the Electric Light Committee of the Corporation to reduce the cost of the current.

Sporting Rights in the Nidd Valley.—The arbitrations which were held some time ago between the Bradford Corporation and two holders of property in the Nidd gathering ground have at last been finally disposed of. In the report of the proceedings which appeared in the "JOURNAL" for July 7 (p. 59), it was stated that Mr. Yorke, one of the claimants, urged that he was entitled to the whole of the sporting rights over the estate in question; while Mrs. Winn, one of the leaseholders of the land, claimed rights over her land. The Corporation expressed their willingness to pay one of the parties; and Mr. Yorke has now intimated that he is prepared to give up his claim, except as regards the freehold land, about which there was no question. Mrs. Winn will therefore receive compensation for the sporting rights over her leasehold land, in accordance with the Umpire's award, which was made subject to settlement by the High Court of the point in dispute.

MISCELLANEOUS NEWS.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

The Half-Yearly Ordinary General Meeting of the Association was held last Tuesday, at the Cannon Street Hotel, E.C.—Mr. J. HORSLEY PALMER in the chair.

The SECRETARY (Mr. Robert W. Wilson) read the notice calling the meeting, and also the following report of the Directors:—

The present half-yearly ordinary general meeting of the proprietors has been convened in conformity with the Association's Acts of Parliament for the purpose of receiving a report from the Directors upon the affairs of the Company, and of declaring a dividend for the half year ended the 30th of June last.

The following summary shows the results of the Association's operations during the half year under review: The quantity of gas made during that period was 4170 million cubic feet; the quantity made in the corresponding half year of 1902 was 3994 million cubic feet—an increase of 176 millions, or at the rate of 4½ per cent.

The total number of lights on the 30th of June last was 2,829,749. At the close of the corresponding half year, it was 2,659,376—an increase of 170,373, or at the rate of 6·41 per cent.

The number of consumers on the books at the close of the half year was 255,079—an increase in the twelve months of 18,762, or at the rate of 7·94 per cent.

The total mileage of mains in use on the 30th of June last was 1911. On the 1st of January last, it was 1873; showing an increase in the half year of 38 miles.

Notwithstanding the cessation of the supply of gas in the town of Haarlem on the 31st of December last, the sale of gas by the Association during the half year shows an increase of 5 per cent. on the figures of the corresponding half year; and the receipts for gas have also increased proportionately.

The gross cost of coal was 9d. a ton less than in the first half of 1902, while a decrease in the value of coke was counterbalanced by the increased values obtained for tar and ammonia, and by economies effected in fuel, so that the net cost of coal was 8·36d. per ton less than in the corresponding half year. The combined effect of these improvements in the workings is reflected in the profit of the half year, which shows an increase of £33,000.

The plant and mains at all the stations were maintained in a due state of efficiency.

Extensive mainlaying has been necessary at Antwerp to supply gas to outlying suburbs beyond the fortifications with which contracts have been recently concluded; and the rapid increase of business in these new districts promises to give a fair return on the capital outlay at an early date. During the half year, the Directors secured a monopoly of the supply of gas for 25 years in Hoboken, another suburb of Antwerp.

At the Gitschinerstrasse Works, at Berlin, additional coke-handling plant has been provided, and is expected to further improve the excellent results already obtained there.

At the gas-works supplying a separate group of suburbs, Weissensee, Französisch-Buchholz, &c., to the north-east of Berlin, an extension of the retort power has become necessary, and six settings of retorts are being erected there.

At Brussels, the Directors secured a ten years' prolongation of the Association's concession in the Commune of Forest—*i.e.*, till 1934.

At the small station of Brüx, the construction of a new gasholder of 76,000 cubic feet capacity was commenced.

At Hanover, the system of mains has been considerably extended in the outer suburbs. A contract has been concluded with the Commune of Kirchrode, securing to the Association the monopoly of the supply of gas to private consumers till the year 1950.

The Directors concluded an agreement with the Municipal Authorities of Prague by which the Association's rights to supply gas have been assured till 1962, with an option to the Authorities of purchasing the works and mains within a fixed period on specific conditions.

The Association's monopoly for the supply of gas in the adjoining Commune of Karolinenthal was prolonged by 45 years—*i.e.*, till 1962.

The new gasholder of 400,000 cubic feet capacity was finally completed.

The liquidation of the Association's remaining assets at Haarlem was proceeded with—the Directors having accepted favourable offers for both land and buildings; and there is reason to believe that this account will close satisfactorily.

In conclusion, the Directors desire to draw the attention of the proprietors to the accounts for the half year ended the 30th of June last. These have been duly audited, and from them the Directors have, in accordance with the provisions of the Companies' Clauses Consolidation Act, prepared a scheme showing the profit of the Association for the half year and the portion thereof applicable to the purposes of dividend, which they recommend now to be declared—viz., a dividend of 5 per cent. for the half year ended the 30th of June last, payable, free of income-tax, on and after Tuesday, the 10th inst.

The CHAIRMAN said it was now his duty to move—"That the report of the Directors upon the affairs of the Association be received, adopted, and entered upon the minutes." Before addressing a few remarks to the proprietors upon the report, he had to make a personal explanation as to his presence in the chair. Those of the proprietors who were present at the meeting six months ago would remember that, owing to the regettable absence of the then Chairman (Mr. Newton), he (Mr. Palmer) had to fill his place. Since then, Mr. Newton had been forced to the conclusion that his health was such that he could not continue to fulfil the somewhat arduous duties which devolved upon the Chairman of a great concern like this, and had placed his resignation of that office in the hands of his colleagues. He (Mr. Palmer) was happy to say that Mr. Newton still remained upon the Board as a Director, and they hoped to have the benefit of his vast experience for many years to come. Mr. Newton had served the Association, first as Auditor and then as Director, for the long period of forty years, during which time he had only on two occasions failed to attend a general meeting of the proprietors. His (Mr. Palmer's) colleagues had seen fit to elect him to the honourable position vacated by Mr. Newton; and at the same time had elected Mr. Lucas to the office of Deputy-Chairman, which he himself had formerly filled. As they had both served the Association as faithfully as they could, and to the best of their ability, for 28 and 23 years respectively, they would certainly continue to do what they could for the interests of the Association in their new positions. Now for a few words with regard to the report and the

accounts. The report was not an exciting one. It did not chronicle any very great events. The Directors had not got to announce to the proprietors that they had secured the lighting of one of the great Continental towns; neither had they to again report that they had inaugurated some important new works at any of the large stations which the Association lighted. Their report was a simple chronicle of steady increase in the business at nearly every station; and it was a chronicle which was interesting, he thought, from the figures which it gave, and to which he should allude, as well as to the comparisons that these figures evoked. As he said six months ago, they had then a fairly good half year to report upon, and he then prognosticated that there was every probability of the next six months being equally satisfactory. It certainly was a matter of considerable satisfaction to the Directors to be able to draw up the present report, and also to submit to the proprietors the figures with regard to the accounts which had been read, because they showed that there was a regular steady increase both in the business and in the profits. Taking the balance-sheet, what were the figures that were there given? In the corresponding half of 1902, the profits were £165,912; in the past half year, they were about £199,697. The result was that the Board were able to pay the proprietors their 5 per cent. dividend, without calling upon the fund which was known as the dividend equalization fund, and from which in the corresponding half year of 1902 they had to draw £24,000. This result was eminently satisfactory. With regard to the dividend equalization fund, he wished to make one remark. It was a feature of great strength in their accounts, and it was a factor of great strength to the Directors. And for this reason: Not merely was it so when the profits of the Association in the regular working—owing perhaps to the very high price of coal, or something of that sort—did not result in the full 5 per cent. dividend, but, it must be remembered, there were other events which took place in, or affected, gas-works (such as great strikes perhaps, or a war upon the Continent); and it was on occasions of this kind that the Directors would be able to look to the dividend equalization fund to maintain what had always been the policy of the Board—a steady, regular dividend for the proprietors. Turning now to the figures making up the profit to which he had alluded. Before they arrived at the figure of £199,000, every possible provision for amortization, depreciation, and fair wear and tear had been made by the Directors. As to the causes of the profit, the increased sale of gas was general at all the stations, except Lille, where there had been very bad trade and very bad strikes, though, he was glad to say, their own workmen did not participate in them. The general result was that they had received from the sale of gas £37,000 more; but, on the other hand, they had had to pay £5000 of this in contributions to the municipalities in the towns they lighted. This therefore meant that they had received in gas sales a net increased amount of £32,000. Coke, however, had fallen away in value very much indeed on the Continent. It showed in their case a decrease of more than £13,000 to set against the larger amount received from the sale of gas; but, owing to economies in working and to the increased revenue derived from their operations in turning ammoniacal liquor into the various products—caustic ammonia, muriate, and sulphate of ammonia, and from the sale of tar—this fall in the value of coke had, to a great extent, been counterbalanced, with the result that their balance-sheet profit on the 30th of June last showed an increase of £33,785 over that for the corresponding six months. Turning from the accounts, he said a shareholder had written him a letter the other day—it was a very interesting letter—upon the subject of vertical retorts. He might say at once that he was always glad to receive such letters from shareholders, because it showed they took an intelligent interest in matters appertaining to gas making and in the affairs of the Association. As he pointed out to his correspondent—a point which he took the opportunity of emphasizing to the general body of proprietors that day—their engineers were always to the forefront in recommending the adoption of any new machinery, any new system of carbonization, or anything that they thought, after fairly working it out, would be of advantage to the Association; and for the past two years they had been working out the details of settings and so on—in conjunction with some of the most celebrated engineers in Germany, to see whether they could not perfect a system of vertical retorts which would be of benefit to the Association. He believed the plans and drawings were now arriving at completion, and he hoped at some future date to be able to report upon the absolute practical working of such settings, which they contemplated erecting some day at the works near Berlin which was well known to all the proprietors by the name of Mariendorf. Into the work of the half year had come various inspections of the stations by the Directors. These visits were very useful in many ways. They gave every Director a chance of seeing, on the spot, exactly what was going on, and they were able to look into every detail—for instance, questions of interest were referred to them with regard to political matters, as well as to the working of the stations. During the past half year, Brussels, Antwerp, and Lille had been visited by Sir Chandos Leigh and Sir Charles Jessel; and, accompanied by Mr. Pigou, he (the Chairman) had just returned from a long tour of inspection at Frankfort, Prague, Berlin, Hanover, and Aix-la-Chapelle. He was not going to weary the proprietors with all the details of the reports which were sent in by these Directors to the Board concerning these different stations; but he might say, for the proprietors' information, that they found everything in the most perfect working order—everything fully equipped and fully prepared to meet the winter's great work which was before them; and he had no hesitation in saying that they would be able to fufill all the obligations which were placed upon them by the Municipalities and the customers at every single station. The Board had, as would have been learnt from the report, continued the policy of pushing out beyond the towns which they lighted, and bringing into their net the suburbs of those towns which they really thought would have a good future before them. This was remarkably the case at Antwerp. They had there stretched out their feelers in all directions. Now they heard there was a likelihood of the old fortifications being pulled down; and if this were the case, in the next few years, the policy adopted by the Board—of embracing the communes outside the fortifications—would, they might all be perfectly certain, give excellent results. He did not think he had anything more to refer to excepting a very sad event. It was only in the last few weeks that a vacancy had been caused on the Board by the death of a very well-known and (he might say) eminent man—Colonel Josiah Wilkinson, who was a Director for 29 years. He (the Chairman) could hardly describe to the proprietors in a few words from the chair the affection his colleagues felt for their departed friend, and their appreciation and estimation of the great services he rendered to the Association. He had a perfect knowledge of French, and had been of great use to the Association on many occasions. He was an admirable and genial speaker; and his advent at any of their works on public occasions was looked forward to with the greatest pleasure. In his work, too, at the Board he was most assiduous—in fact, he continued his duties up to within three weeks of his death, though he had reached the extreme age of 91 years. The Board had not had time to fill Colonel Wilkinson's place. His funeral only took place a fortnight ago; but he (the Chairman) hoped, on the next occasion of the meeting of the proprietors, the Directors would be able to present to them a gentleman who, they considered, would be a worthy addition to the Board.

Mr. Arthur Lucas seconded the motion, which was unanimously agreed to.

Proposed by the Chairman, and seconded by Mr. J. H. Birchenough, the dividend recommended in the report was declared.

Mr. M. S. Pilcher moved a hearty vote of thanks to the Chairman and Directors for their conduct of the business of the Association; remarking that such results as those they had had laid before them were not obtained by simply sitting down and doing nothing.

Mr. John Drew, in seconding, said he had learned with considerable pleasure from the report of the continued advance of the business and of the larger profits in the past half year; but there was one thing the Chairman did not refer to, and upon which he should like some information. That was the position of the Association with reference to cooking-stoves and heaters. He (Mr. Drew) did not know whether on the Continent these things were used as much, or were advancing in use so rapidly, as they were in this country. They found that the use of gas for these purposes—not simply at night, but in the day time—was very rapidly increasing in the hours between six o'clock in the morning to about four o'clock in the afternoon. He should be glad to know that the same result was being achieved on the Continent. He was sorry to hear that the Association were not receiving the price they used to do for coke. The price of coke in England was certainly better than it was, and, with an advanced price for coal, they generally found that coke followed it. However, it was a good thing to hear that the ammoniacal liquor and its products were still increasing in price, and were to some extent making up for the loss on coke.

The motion having been unanimously carried,

The Chairman acknowledged it, and then referring to Mr. Drew's question, said he thought the Association went one better than the London Companies with regard to stoves, because for cooking and heating they sold gas at a cheaper price than for lighting. In consequence, their business in this respect had increased enormously in the past ten years. So much so, that 50 per cent. of the gas consumed at Hanover was used for what they called industrial purposes and for heating and cooking; and at Berlin, the quantity was 30 per cent. These figures gave them some idea of the vast amount of gas used in this way; and equally so of the enormous supply they had at nearly all their stations of heating appliances—stoves, ironers, curlers, and every conceivable thing in that line.

Mr. Corbet Woodall proposed a vote of thanks to the officers and staffs both at home and abroad. He remarked that it had been his pleasure, as well as that of the Directors referred to by the Chairman, to visit most of the stations of the Association during the past half year; and he was able to endorse, in the fullest possible manner, what the Chairman had said as to the condition in which the works were found. The Association had, in their agents and engineers, a body of cultivated, zealous, and honourable gentlemen; and the proprietors were to be congratulated upon having men so capable of carrying on their work, and to represent the interests and the honour of the Association on the Continent.

Mr. Clarence Pigou seconded the motion; and it was unanimously agreed to.

COLONIAL GAS ASSOCIATION, LIMITED.

The Annual General Meeting of the Association was held last Tuesday, at Suffolk House, Laurence Pountney Hill, E.C.—Mr. Samuel Spencer in the chair.

The Secretary (Mr. A. J. Kingdon) read the notice convening the meeting and the Auditors' report; and the report and accounts were taken as read.

The Chairman—having mentioned that Mr. Henry Andrews, jun., one of the members of the Melbourne Board, was on a visit to this country, and was present at the meeting—said that last year when the Board had the pleasure of meeting the shareholders, he ventured to say there was every prospect of an increasing business for the year which ended on June 30 last; and he was glad to say the result of the working, as shown in the balance-sheet, had justified what was then stated. It had not quite come up to what was hoped or expected. But trade in Australia following the very severe drought, had not been good; and so they were only able to announce an increase of 5¾ per cent. in the consumption of gas. This, in itself, considering all things, was not so bad; and, adding the results from better working, cheaper coal, and other matters, the net revenue had come out fairly satisfactorily. As would have been noticed, the total net increase amounted to some £406 compared with the previous year; the figures then being £2703, and for the year just ended £3109. He thought it might be of interest to mention that the sales were steadily progressing, as would be seen by the figures of the past three years: In 1901, they amounted to £14,025; in 1902, to £14,895; and in 1903, to £15,662. The actual profits were: In 1901, £4995; in 1902, £4927; and in 1903, £5665. In view of these figures, the Board felt they could now increase the dividend; and there was, as far as they could see, every hope of their continuing to do so.

It was thought, if, in the event, this proved to be correct, that they would, at an early date, see their shares at par, as the rate of dividend now proposed gave to the buyers of shares at their present price above 6 per cent. on the purchase. It would have been noticed that the Directors had written off £500 for depreciation; and this, added to the keeping of the works in an efficient state of repair (which the Managing-Director reported to be the case), must be satisfactory to all the shareholders. The amount carried forward was about the same as last year. The loan that appeared in the balance-sheet had been paid off since the accounts were made up. The capital account, it would be observed, was only £800 more than in the previous year; £200 being the final payment to make fully-paid the 16,833 ordinary £5 shares. Last year the shareholders gave their sanction to the increasing of the debentures by £2000 or £3000. The balance-sheet showed an increase of £600; and since closing the accounts, the Directors had received about £1200 more. This would, he believed, put the Company in sufficient funds for some little time. The stocks, the Managing-Director reported, had all been taken under their value; but doubtless the shareholders would observe that they were some £600 more than last year. This arose from the larger stock of coal, which Mr. Swinburne thought it well to have for the winter. The shareholders would be pleased to know that the Board had no difficulty in renewing the whole of the debentures that fell due at the end of last year, and that they had done so for a further period of seven years, and at the same rate of interest—viz., 5 per cent. During the year, the number of consumers had increased by 130. The Managing-Director also reported that the harvest had been the best experienced for some years; and he considered that Australia was likely to have some years of good trade, that the position of the Association would be well maintained in the future, and that the expenditure on the works would give a good return. He further expressed the opinion that, before long, they would be paying from 5 to 6 per cent. dividends. In Australia as here, the Welsbach burners were being extensively used. As the shareholders were aware, with these burners a greater amount of light was obtained by using less gas; and had it not been for this, the profits, Mr. Swinburne said, would have been considerably more. The bad and doubtful debts were only £21—a sum equal to merely 1s. 6d. per cent., which must be regarded as very small indeed. The outstanding accounts were reported as being all good. In conclusion, he would like to mention the resignation of Mr. John Coates, who had been a Director of the Association from its inception. But living so much abroad, he thought it wise, in the interests of the concern, to retire, and, anticipating it at their last meeting, the Directors elected Mr. Charles Hunt to his seat. Mr. Coates was, in every way, heart and soul for the well-being of the Association, and would at all times give them the benefit of his knowledge and advice.

Mr. W. C. Parkinson said he had much pleasure in seconding the resolution. As would have been noticed, the Directors had nothing startling to bring before the shareholders. Everything, he thought he might say, had been going on fairly and satisfactorily in Australia. He believed they had as good prospects now of an increase as ever they had; and they were looking forward, as the Chairman had said, to still better things in time to come. He (Mr. Parkinson) was glad indeed they were able to slightly increase the dividend on this occasion; and this gave an earnest of what they hoped would be in the future.

Mr. Deputy White said he observed in the accounts an item "Shares in the Brisbane Gas Company, Limited (100 of £5 each fully-paid);" and they were carried out at £1020. He should like to know if this was the amount paid for them. He also inquired whether all the works were paying their way, and mentioned that he regarded the report as a very gratifying one.

The Chairman replied in the affirmative to the first question, and added that the shares were now worth £1100. They returned a dividend larger than the Association were paying; so that it was a fine investment. They were now supplying twelve towns, at each of which they had works. Some of them were miles apart—100 miles most of them; and Geraldton was over 2000 miles away. The increase there had been 17 per cent. There was one of the small works that had been rather under a cloud; but they were almost certain to have one out of twelve. It was a mining population in that case; and the people were not doing so well just now. At the same time, if the Association wanted to dispose of those works, he believed they would get as much as they gave for them.

The report was unanimously adopted.

The Chairman next proposed a dividend at the rate of 6 per cent. per annum, free of income-tax, making 4½ per cent. for the year. This, he remarked, was ½ per cent. more than in the previous year. They hoped now to maintain the dividend at that rate, or do even better

Mr. G. H. Haywood, in seconding, said he regarded this dividend as very satisfactory indeed, considering the cloud that seemed a while ago to have settled over Australia. He thought they might congratulate themselves on having obtained another ½ per cent. dividend, which had been completely earned.

The proposition was agreed to.

On the motion of the Chairman, seconded by Mr. Deputy White, Mr. Haywood was re-elected a Director.

In his acknowledgment, Mr. Haywood observed that it was a very gratifying thing for him to remember that, though his health may have failed a little now, there was a time when he filled a rather important position in connection with the Association, and when probably it would have gone altogether under, if he and one or two others had not come forward with the hard cash at the right moment, and relieved the situation.

Mr. Charles Hunt having moved the re-election of the Managing-Director (Mr. George Swinburne),

Mr. Henry Andrews, jun., felt that he was very fortunate in being able to be at the meeting to second the re-election of his old friend. He considered that one of the valuable assets of the Company was the fact that Mr. Swinburne was looking after their property in Australia. He (Mr. Andrews) had an intimate connection with their Managing-Director—perhaps more so than any other man in Melbourne; and all who were acquainted with Mr. Swinburne knew him to be a thorough man of affairs, with a very clear head, a wonderful grasp of detail, and a good knowledge of men. Although he was a very busy man, he gave a great deal of his time to the work of the Association.

The motion was heartily carried.

On the proposal of Mr. Samuel While, seconded by Mr. W. Chaffer, Messrs. Wood, Drew, and Co. were re-appointed as Auditors.

The usual complimentary vote to the Chairman and Directors and officers, both at home and in Australia, terminated the proceedings.

SOUTHAMPTON GAS COMPANY.

The Half-Yearly Meeting of the Company was held last Wednesday. Captain Corse-Scott presided, in the absence through illness of the Chairman of the Company (Dr. Trend).

The report submitted stated that the profit and loss account showed, after payment of debenture interest and all other charges, an amount available for dividend of £15,509. The Directors recommended the payment of the maximum dividend of 5 per cent. per annum (less income-tax), amounting to £11,270 for the half year on the ordinary stock. This left the sum of £4239 to be carried forward. There was again a satisfactory increase of 17,657,000 cubic feet of gas sold, as compared with the June half of 1902. The receipts for gas showed an increase of £2180. The number of consumers on the prepayment meter system amounted to 8800. The payments for rates and taxes for the year ended June 30 amounted to the large sum of £5373—a charge of nearly 2¼d. per 1000 cubic feet of gas, paid by the consumers on this account. Owing to favourable contracts made, the expenditure during the past half year for coals and oil showed a decrease of £2163, as compared with the June half of 1902, notwithstanding the large increase in the output of gas. The Directors had offered for sale £5000 of ordinary stock at £110 per cent.—an advance of £2 on the last sale—and the amount applied for was £15,010.

The Chairman, in moving the adoption of the report and accounts, said he thought the result of the working was exceedingly satisfactory. The gas sold during the six months under review was 285½ million cubic feet, as compared with 268 millions in the corresponding half year. The receipts for gas during the same periods were £45,548 and £43,368 respectively—showing an increase last half year of £2180. The great popularity and general use of incandescent gas-burners had, of course, considerably reduced the consumers' bills; but at the same time incandescent lighting had been beneficial to gas companies by proving the superiority of the system, both as regards illuminating power and efficiency, as compared with the electric light. This was further demonstrated by the fact that in many large towns in which the corporations owned both the electric light and gas undertakings they had deliberately rejected electric lighting and substituted incandescent gas-lights for the public lamps. The attention of the proprietors should be called to the fact that the sum of £5373 had been paid during the year ended June 30 last for rates and taxes. They would observe, also, that there had been a decrease of £2163 in the expenditure for coal and oil last year, as compared with the June half of 1902. This was due to favourable contracts made by the Directors. He might remark that, though the Company had the large capital of £657,000, the bad debts during the last six months amounted to only £120.

Mr. J. C. Moberly seconded the motion, which was carried.

The dividend recommended was afterwards agreed to; and votes of thanks were accorded to the Directors and the staff—the Secretary (Mr. C. C. Smith) being congratulated on his restoration to health.

THE RICKMANSWORTH URBAN COUNCIL AND THE GAS-WORKS.

The Purchase of the Undertaking—And a Gas Explosion.

No one paying a casual visit to the pretty little village of Rickmansworth would suspect the possibility of anything approaching an agitation among the inhabitants; but a little inquiry shows that here, as elsewhere, the proposal of the Local Authority to join the ranks of municipal traders has caused a sharp division in public opinion. This, however, must now be regarded to a certain extent in the light of ancient history, for in the last session of Parliament the Urban District Council obtained (with the requisite permission of the ratepayers) an Act empowering them to purchase the undertaking of the Rickmansworth Gas Company. This Act, which received the Royal Assent on June 30, stipulated that within three months of its passing the Council should give to the Company notice in writing of their intention to purchase; and this was done towards the end of September—practically speaking at the latest time allowed. The next step, of course, is to proceed to arbitration; but though the Company have fully prepared themselves for this, the Council do not seem to be displaying any very great alacrity in the same direction. There may be good reason for this hesitancy; but it seems a little hard on the Company that they should, as it were, be kept hovering between life and death for an indefinite period. One of the most unfortunate results of the Council's action, it appears, has been to put a stop to proposals made by the Company for the carrying out of much-needed extensions of the mains to the outlying district. Chorley Wood, for instance, has had to remain in darkness, though the Directors had even got so far as the preparation of specifications of the work required to furnish a supply of gas there, when they were prevented by Parliament from spending any further money on capital account without the consent of the Local Authority.

Whether or not the Council will be able to make a profit on the works when they do acquire them, is a matter which concerns the ratepayers; and seeing that the point is one of such grave importance to them, it would naturally be supposed that full consideration had been given to it. Looking to the circumstances of the case, however,

there seems to be some reason to doubt whether the community could —at any rate, for a number of years—derive any benefit from the ownership of the works, even if the existing debt were not so large as to make its further increase just now a most doubtful policy. The rateable value of Rickmansworth at the present time, for both land and buildings, is only £23,468; but if it could be shown that it was rapidly increasing, and likely to continue to do so, there might not be much to be said on this point. As a matter of fact, however, the rateable value of the place is only growing by about £200 a year; and the Council have but recently incurred an expenditure of over £30,000 on a sewerage scheme. In this condition of affairs, it appears only reasonable to suppose that some difficulty may be found in borrowing the further large sum that will be required to purchase the gas-works, apart altogether from the question of whether or not the already heavy rates will have to be added to for the purpose of meeting an annual deficit on the undertaking.

Now let us consider for a moment the financial aspect of the contemplated deal. The Council, after having been advised that they could acquire the works for less than £20,000, have already made an offer of £22,400, which includes the customary 10 per cent. for compulsory sale. In 1902, the Company secured an Act by which the original 10 and 7 per cent. shares, amounting to £15,700, were converted into £28,000 of 5 per cent. stock, so that the offer made by the Council represents less than the par value of the capital as it exists now. The profit last year, exclusive of the mortgages, amounted to £1233; and the dividends paid on the old shares have been at the rates of 6⅜ and 4⅜ per cent. respectively. If, as the Company assert, the profit named is not only maintainable, but increasing—and that there is good ground for this contention is shown by the fact that during the past nine years the consumers have increased from 216 to close upon 700—the Council may after the arbitration find themselves face to face with a larger capital outlay than they contemplate; and, though the present owners are able to show such satisfactory results on their working, it does not necessarily follow that the Council, saddled with the interest and sinking fund charges, will be able to do the same. The Council and the consumers are already treated very fairly by the Company. For years past gas has been supplied at less than the standard price of 4s. 7d. per 1000 cubic feet; while the Council (who will be very big customers, employing gas-engines at their sewage works) are allowed a reduction of 25 per cent. off the gross price. One would have thought that such a discount would have been appreciated by everybody, and that the ratepayers would have been content to let well alone.

If the hopes of the Company should be realized, and the Arbitrator's award them from 28 to 30 years' purchase on the profit of £1233, the price to be paid by the Council will be far in excess of what has been offered by them, without taking into consideration the 10 per cent. addition for compulsory sale, the liabilities, and the money required for further extensions which the Company were prepared to execute, and for powers to undertake which they went to Parliament. Even after the Council obtained their Purchase Act, the Directors approached them and laid before them a statement of the extensions which were really necessary over the next few years; but the Council refused to discuss the matter in any shape or form. There was one point in particular, of which much was made when the Council were obtaining their Act—namely, the purity of the gas. Time after time, the Engineer of the Company (Mr. Henry Hill) has drawn attention to the impossibility of purifying the gas with the apparatus at present at his disposal; but the Council apparently considered that this was not an urgent question. The result of their objecting to the extensions proposed by the Company has, of course, been that the consumers have suffered; and it is only fair that this should be made clear to those who might otherwise feel disposed to blame the Company for any shortcomings in the present supply of gas.

We shall watch with some interest the development of affairs at Rickmansworth. Time only can show which section of the inhabitants are in the right—those who have strongly advocated the purchase, or those who have with equal vehemence urged that the works should be left in the hands of the Company. It, however, certainly seems that, whatever may be the general result of the purchase of gas-works by local authorities, in this particular case there is at least a possibility that the rates may for a number of years be called upon to meet a deficiency; and, having regard to the amount of the existing debt in relation to the rateable value, such an outcome would be a serious matter for the ratepayers

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Subsequent to the preparation of the above article, an incident has occurred which gives some idea of how gas matters are regarded in Rickmansworth. Some time ago, the Council asked Mr. Hill, the Gas Company's Engineer, to give them an estimate for laying on the gas to their sewage-pumping stations, and supplying and fixing all valves, meters, and connections. The price he named for the work was £81 17s. 6d., which included 83 yards of 4-inch pipe and one 200 light and two 50-light meters. The Council, in their wisdom, however, considered this estimate was too high; and the Clerk was instructed to obtain prices from three other firms. This it is stated he did not do; but the job was given straightway to the Contractors for the sewage works. This firm thereupon laid three-fourths of the service and filled it in, without giving Mr. Hill any chance of inspecting the work, so as to see whether the pipe had been properly laid. But worse was to follow; for on Friday afternoon, while engaged in fixing the 200-light meter, the Contractors' men seem to have been foolish enough to examine a joint on the inlet or outlet by the aid of a naked light. The result must have far surpassed their wildest dreams, for the resultant explosion blew the meter to smithereens, broke the door of the place to pieces, smashed all the glass in the windows, and lifted a portion of the roof off. The men were knocked off their platform; but fortunately no one was seriously hurt. It will be interesting to learn, when the job is quite finished, how much the Council will have saved by their refusal to accept the tender prepared by Mr. Hill, and also whether they are still of opinion that the Gas Company are not the best people to undertake such work as the fixing of meters. This little incident should form a good object-lesson to the ratepayers.

GAS COAL CONTRACTS AT BELFAST.

In a paragraph which appeared in the "JOURNAL" for the 27th ult., it was stated that the Gas and Electric Committee of the Belfast Corporation had concluded their purchases of coal, and divided the order between four firms, at an average price of 14s. 2½d. per ton. At a subsequent meeting, however, it was resolved that, owing to one of the firms having been given an opportunity of amending their quotations, to the possible disadvantage of others, the resolution accepting the tenders should be rescinded, and tenders once more advertised for. At the meeting of the County Borough Council on Monday last week, Mr. Andrews, the Chairman of the Committee, in moving the adoption of their minutes, which included the above matter, explained that tenders had been advertised for in the ordinary way, received, initialled, and sent to the Engineer (Mr. James Stelfox), who recommended that the quantity of coal needed should be taken from certain contracts. In looking over quantities, he (Mr. Andrews) found that they were short; and so he asked one firm of contractors, whose price was higher than others, if they could not reconsider their offer. They agreed, and reduced the price by 5d. per ton. If there was a fault in asking them to do this, the blame rested on himself. He thought it a good thing for the ratepayers generally to get the coal at as suitable a price as possible. The Committee decided that, as one firm had been given an opportunity of changing their tender, all the others should be reconsidered, and they advertised again. Mr. Dempsey said the Chairman had no right to ask people to alter their contract without the concurrence of the Committee. After discussion, a motion was submitted that the Local Government Board be requested to hold a sworn inquiry into the matter; but the Lord Mayor declined to accept it. He said if the subject was considered of sufficient importance, a special meeting of the Council could be called to discuss it. The other matter on the minutes, relating to the rescission of an appointment in connection with the electric light undertaking, was disposed of by being referred back to the Committee. Whereupon Mr. Andrews said he took this as a vote of censure upon himself; and therefore he would put his resignation into their hands. He would not attend the Committee in future. The minutes as amended were passed.

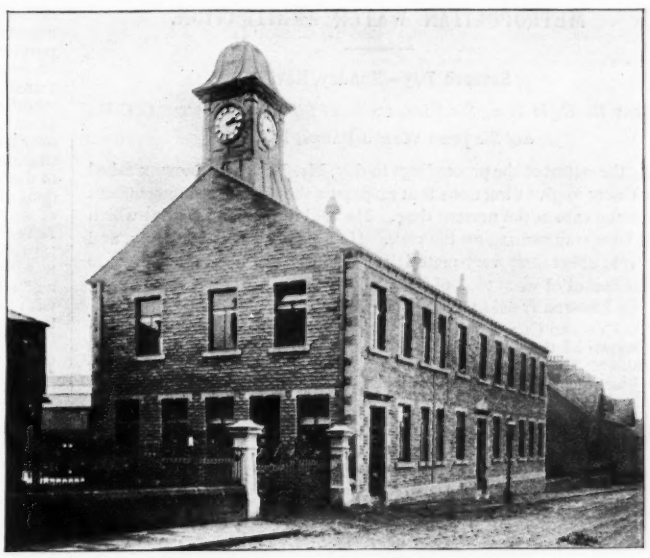
WENLOCK GAS-WORKS EXTENSIONS.

Local Government Board Inquiry.

An inquiry has just been held by Mr. R. H. Bicknell, on behalf of the Local Government Board, into an application for sanction to borrow £1400 for the extension of the Wenlock Gas-Works. The Town Clerk (Mr. F. H. Potts) having explained that the population at the last census was 2180, the assessable value £8036, and the outstanding loans £6128, Mr. Fletcher (who represented Mr. Whitley, Lord Forester, and Mr. R. H. Benson, who own 6120 acres out of 8662 acres in the parish), said his clients received no benefit either from the gas-works or the water-works, and so they asked to be relieved from contributing towards them. He contended that it would be better to sell the gas-works than incur further expense. Mr. W. Belton, of Shrewsbury, who had been consulted with regard to the proposed alterations, said there was no scrubber at the works; and of the three purifiers only one was really fit for use. The capacity of the gasholder was 7000 cubic feet; while the heaviest day's consumption was reckoned to be 10,670 feet. It was therefore proposed to put up a new 12,000 cubic feet holder, which would cost £620. The retorts were barely equal to the requirements; but a new bench had been put in, which would furnish an additional 7000 cubic feet of gas. He thought the Council bought the works very cheaply at £1500, and £500 for repairs. The Inspector remarked that Mr. Fletcher had, in correspondence with the Local Government Board, alleged mismanagement and bad methods of conducting the works; and he asked Mr. Belton to explain in what manner the works had been carried on. Mr. Belton said small works like those at Wenlock could not be operated nearly so cheaply as larger ones. He pointed out, too, that in the years quoted by Mr. Fletcher coal had risen 6s. a ton. He did not consider more men had been employed than were necessary. The price charged for gas was 6s. per 1000 cubic feet. From the 200 tons of coal used, 1,613,600 feet of gas had been produced; and this would be 8000 feet per ton of coal, which was all that could be obtained from the existing works. Mr. Fletcher said there was a waste of 25 per cent., which he considered was due to the street-mains being in bad condition. He contended, too, that there had been no increase in the number of consumers since the Council had taken over the works. There were only 70 consumers; and for their convenience the ratepayers were asked to repair what was admitted by many people to be a bad bargain. The gas-works were a great burden to the rates. Asked by the Town Clerk what the life of a gas-main was, Mr. Belton said it varied considerably. While some, under bad conditions, would last only a few years, others would go on for a hundred years. There were mains in Shrewsbury which were put down in 1820, and which were in capital order now. The gas sold last year at Wenlock was 12½ per cent. more than in the previous twelve months.

Water Scheme for Thurnscoe.—An inquiry was held on Friday week at Thurnscoe, before Mr. W. O. E. Meade-King, M.Inst.C.E., one of the Local Government Board Inspectors, into an application by the Parish Council to borrow £3284, for the purpose of a water supply for the district. It was made on behalf of the township by Mr. F. E. Nicholson, Clerk to the Doncaster Rural District Council, who stated that the estimated daily consumption would be 47,320 gallons, and the source of supply would be the Hemsworth Rural District Council. The latter body received the water from the Barnsley Corporation, whose reservoir yield was 2,888,000 gallons per 24 hours. There was no opposition to the application.

MESSRS. R. DEMPSTER AND SONS' NEW OFFICES.



Messrs. Robert Dempster and Sons, Limited, of Elland, celebrated the opening of their new offices by inviting the whole of the staff, a few local gentlemen, and the managers of local gas-works to dinner, which was served in the new drawing office on Saturday. Sixty-five guests were present. The new offices, which are shown in the accompanying illustration, are 84 feet long by 33 feet wide, and consist of two floors; while underground there is installed a fireproof safe, an electric photographic plant, and heating apparatus. The building is of stone, of neat substantial design, provided at one end with a clock-tower and four-faced clock. The interior of the offices is fitted up in a thoroughly substantial and creditable manner, and the whole is lighted by means of incandescent gas-fittings of the latest designs. After dinner, a few toasts were submitted; that of "The Firm of Robert Dempster and Sons, Limited," being proposed by Dr. Hoyle in well-chosen and congratulatory terms. Mr. J. W. Broadhead, the Managing-Director, responded, and pointed out that the question of building new offices had practically been forced upon them. When he succeeded to the management in 1892, there was only a staff of six; and now the office staff had increased to a total of thirty. This, of course, meant that trade had grown and expanded very much. At that time the business generally was in an unsatisfactory condition; but by making a point of always doing thoroughly good work, as expeditiously as possible, as well as by developing the retort-setting branch and conveying work, and enlarging the capabilities of the firm all round, they were now in the front rank of gas apparatus contractors. He pointed out that when the business was founded in 1855, it was practically confined to retort setting. The largely increased business had necessitated extensive alterations in the works. The gasholder sheds and fitting-shop had been entirely remodelled and enlarged, while new hydraulic plant and 23 additional machines had also been put down. Gas engines had been adopted as the motive power, except in the foundry, where a twenty-ton electric crane was employed. The offices were fitted with five National telephones, connected by two lines to the Exchange. There were also ten intercommunicating telephones, and a system of bells. He concluded by expressing the hope that the large outlay upon the building of new offices would be more than repaid by the extra comfort and more healthy conditions which the officials would enjoy for the performance of their duties. The other toasts included "The Gas Industry" and "The Staff;" the latter being proposed by Mr. Broadhead.

NOTTINGHAM CORPORATION GAS AND WATER SUPPLY.

The City Auditor's Report.

The City Auditor of Nottingham (Mr. Walter Gath, A.C.A.) has lately issued his report on the accounts of the Corporation for the past financial year; and we extract therefrom the following particulars in regard to the gas and water undertakings.

The receipts on capital account of the Gas Department amounted to £1,139,333, of which £44,000 was received from the reserve fund investment account; leaving £1,095,333. The expenditure was £1,133,890, of which £16,165 had been incurred in the year (£14,017 for new meters and stoves). But a sum of £52,500 was written off, including the above-mentioned £44,000; leaving £1,081,390, and an unexpended balance of £13,942. Turning to the revenue account, the income was £313,548, or an increase of £9200; and the expenditure £254,406 18s. 7d.—a decrease of £4034. The increase in the profit was consequently £13,234; the profit in 1902-3 being £89,141 against £75,907 in 1901-2. The additional income is accounted for as follows: Increase in sales of gas, £12,244; do. of residuals, £2880 (total, £15,124); less decrease in sundries, £5924. Among the items constituting the reduced expenditure are the following: Decrease in coal, £5949; purifying, £733; and carbonizing, £249. On the other hand, there was a rise of £2572 in the rents, rates, and taxes, in addition to an increase last year of £1354; making £3926 in two years. The gross profits, after being charged with interest on capital £46,869, sinking fund proportions £4434, and depreciation £1500 (together £52,803), left a net profit of £36,338—an increase of £11,821 on that for the previous year.

In view of the fact that the accounts of the Gas Department had occupied a considerable amount of public attention, and frequent comparisions had been made with Sheffield, Mr. Gath procured copies of the two half-yearly balance-sheets of the Sheffield Gas Company for the year 1902, and made the following comparisons:—

	Nottingham.		Sheffield.
Gas sold, in cubic feet	1,880,026,700	..	2,720,601,000
Do., including meter and stove rents	£268,790	..	£274,707
Equal to per 1000 cubic feet.	2s. 10d.	..	2s.
Residual products	£69,458	..	£117,817
Equal to per 1000 cubic feet.	8·87d.	..	10·39d.
Manufacture of gas	£194,900	..	£231,345
Equal to per 1000 cubic feet.	2s.	..	1s. 8½d.
Distribution of gas	£35,420	..	£29,740
Equal to per 1000 cubic feet.	4½d.	..	2½d.

Referring to these comparisions, Mr. Gath says: "Sheffield does not spend so much as Nottingham in renewing and refixing meters and stoves, whereas they have a considerably larger income from this source. Sheffield occupies the unique position of all gas concerns in the country by being the most favourably situated for obtaining its coal and for disposing of its residual products. The net charge for coal, less residuals, is 1·07d. per 1000 cubic feet—Newcastle-on-Tyne being second, at 3·62d.; whereas Nottingham stands at 6·55d. Whether we pay too high a price for our coal I am unable to state; but it is quite evident we cannot compete with Sheffield on this point. As to the price of the gas sold, the ratepayers must bear in mind that the Nottingham Corporation supply a large outside area, and are bound to do so at the same price as to the citizens of Nottingham. Consequently, the only way we can be recouped for this statutory philanthropy is to keep up the price, and hand over the profit to the credit of the rates." He calls attention to the fact that £44,000 has been taken from the reserve fund and written off capital expenditure, and the same amount from the reserve fund investments to reduce the loans on capital account. He explains that this sum has been borrowed from the reserve fund at various times, and the department was paying interest to its own reserve fund thereon. The money having been spent on capital account, he thinks it was better to write it off, and reduce the very large amount of capital expenditure—or, in other words, depreciate it. He adds that the reserve fund has not been increased for many years, except by the addition annually of its own interest, which last year amounted to £2752; whereas at Sheffield they have a reserve fund of £86,848, and the interest thereon is carried into the year's revenue account. He says it now becomes a question whether the fund should not be built up again by setting aside a portion of the annual profits.

Coming to the Water Department, Mr. Gath reports that the receipts on revenue account amounted to £96,402; being an increase of £4741, of which £4318 was water-rental. The expenditure was £92,289, or £7169 more than in 1901-2. The principal item of increase was £7614 for rates; and the Corporation spent £830 in opposing the Buxton Water Bill. The profit was therefore lowered by £2428. The expenditure on capital account during the year was £31,644. In the printed accounts submitted to the Council, the net profit of £2003 is carried to the depreciation, renewal, and sundry purposes fund. This, in Mr. Gath's opinion, should not be done until the amount ordered to be paid over to the Finance Committee in aid of the rates has been settled, as it involves rectifications in the subsequent year's accounts. With reference to the depreciation of works and plant in the trading accounts, he is not able to offer an opinion as to the particular rates to be written off; but he ventures to raise the question whether sufficient sums are reserved for this purpose, and whether greater amounts are being applied in relief of the rates than the particular circumstances of each department warrant. He points out that this question, in view of its general importance, is occupying a great deal of public attention; and therefore he ventures to suggest that the Council should take the matter into serious consideration. He calls their attention to the fact that there is a general feeling in the country that many municipal undertakings are not conducted with the care their importance demands; and this feeling has, he says, become so intensified that corporation loans cannot be issued at the same rate of interest that has hitherto prevailed. Hence it becomes necessary, if the Corporation wish to borrow on reasonable terms, that they should put themselves in the strongest position possible.

Reversion to Gas Lighting for Ilkeston Tram-Lines.—When the Corporation of Ilkeston decided to adopt electric traction, they included a scheme for lighting the tram-lines by means of electricity. As the track was already illuminated by modern gas-lights—either incandescent, with two or three burners, or ordinary three-burner "Victoria" lanterns—the competition was on somewhat equal lines; and the electricians had a free hand. Last May, the installation was completed, and consisted of arc lamps and two incandescent brackets on alternate trolley poles. The latter failed very early, and were only lighted about half-a-dozen times. The arc lamps seem to have been a source of anxiety, and to have needed constant attention. We learn that the familiar "blink" was there; and it was a nightly occurrence for one or more to be out altogether. The patience of the Lighting Committee was exhausted last week; and the whole of the electric lamps have given place to the old gas illumination.

METROPOLITAN WATER ARBITRATION.

Seventh Day—Monday, Nov. 2.

(*Before the Right Hon. Sir* EDWARD FRY, *Sir* HUGH OWEN, G.C.B., *and Sir* JOHN WOLFE-BARRY, K.C.B.)

At the outset of the proceedings to-day, Mr. BALFOUR BROWNE asked the Court to give directions that no papers should make any comment upon the case at the present time. He held in his hand a print which had been commenting on the case. He thought it was unseemly, and it might affect them very materially. He did not object, however, to a fair record of what took place.

The PRESIDENT said that such comments were highly improper.

Sir EDWARD CLARKE then proceeded to argue the sinking-fund clause on behalf of the Chelsea Water-Works Company. In answer to the President, he said that the suggestion of purchase was first before Parliament in 1880, at the time when Mr. Smith's arrangements were made with the Water Companies.

Mr. BALFOUR BROWNE said it was suggested as long ago as 1821.

Sir EDWARD CLARKE, after a reference to previous Acts, said that in 1894 a new form of sinking-fund clause was adopted, with which he had specially to deal. It appeared in the Chelsea Water-Works Act in 1896. He first wished to call attention to the fact that the term "sinking fund" was used in the year 1886; and it could not possibly have escaped the attention of those who were connected with water companies that the term had been used. In 1894 and subsequently, the expression was repeated—and repeated by persons who had in their knowledge the ordinary purpose and meaning of a sinking fund. The important alteration was the latter words, "Such sinking fund to be held and applied by the Chamberlain of the City of London as Trustee for the purpose of purchasing and holding stock of the Company, and investing the dividends thereon." The Chamberlain was to accumulate the dividends with a view to ultimately extinguishing the capital of the Company, instead of "purchasing and extinguishing" at once. But there was nothing to show that the procedure, which under the first form of the clause must inure to the benefit to the Company, should inure to the benefit of somebody else. So far from this, it was clearly indicated that the sinking fund, when accumulated, was to be for the benefit of the Company. Parliament shrank from allowing the Company to inflate dividends and so put up the value of their shares; and therefore it said: "You shall not be allowed to use this money for the purpose, but a sinking fund shall be established, by which, at some time or other, your capital shall be extinguished;" and in the clauses of 1894 and 1896, there were these words, "or for such other purpose as Parliament may from time to time determine." With regard to this phrase, Parliament was dealing with the continued existence of the Water Company. The Act of 1902 might have been defeated on principle. It might have been defeated in the House of Commons; and in that case, Parliament would have created a fund without providing specially for its application at any particular time. The Companies would have continued; and from time to time Parliament might have been called upon to say what was to be done with the accumulated fund. But he could not conceive it possible that anybody would have suggested that Parliament should take it away from the Water Companies and give it to someone else altogether, or have it thrown over Westminster Bridge. It was not to be supposed that Parliament intended it to be taken away from the persons who had been earning it as part of the revenue of their company. Counsel then dealt with the 1 per cent. for management not being deemed to increase the capital value, and contended that it meant that if ¾ per cent. were found sufficient, the Company were not to be allowed to say that they were entitled to capitalize seven-eighths. But he denied that the 3 or 4 per cent. which represented the amount passed over to the sinking fund was in the same position. They were two entirely different things. The existence of the sinking fund was an advantage to the Companies themselves; and the fund out of which it was paid was one which, apart from the Act, would have been expended by them as part of their profits. The Water Board would come into possession of the undertaking relieved of the necessity of having any sinking fund at all. He asked the Court to put such an interpretation upon the question as would guard the interests and rights of the Companies.

Mr. BOYLE also addressed the Court on behalf of the Chelsea Company, Mr. CRIPPS on behalf of the Lambeth Company, Mr. HALDANE for the West Middlesex Company, and Mr. BALFOUR BROWNE for the New River, the Grand Junction, the Southwark and Vauxhall, and the Kent Companies.

The PRESIDENT gave judgment at great length upon the question before the Court—viz., whether or not the undertaking, as transferred from the Companies to the Water Board, was subject to payments to the sinking fund, or whether it was free from them. The Companies contended that the property was transferred free from this liability; while, on the other hand, the contention of the Water Board was that it was transferred subject to it. Obviously, a decision on this question must affect the value of the undertaking as transferred. Many questions arose upon the construction of the clause which dealt with the matter in the East London Water-Works Act, 1881. It had been contended by Sir Edward Clarke that it was a sinking fund, and that a sinking fund was always a fund for the advantage of the company or institution in respect of which it was formed. One could not extinguish a thing and at the same time give it to the benefit of somebody else. Therefore, looking to the whole scope of the Act of 1886, it appeared to him that the fund was set aside not for the benefit of the Company, but for the benefit of some other unascertained person, or for the public. With regard to the Act of 1884, there was a very similar clause to that which he had dealt with. The Chamberlain was to become a shareholder in the Company, and, like any other shareholder, he had had to receive dividends "with a view to ultimately extinguishing the capital of the Company." This must have been extinguishing it for the benefit of somebody else than the shareholders of the Company. The Court were strongly fortified in coming to this conclusion by the circumstances at the time. In 1880, the question of purchase was under discussion. Turning to the Act of 1902, it was to be borne in mind that, under section 2, the whole undertaking was transferred to the Water Board. The question would, of course, arise whether the shares held by the Chamberlain were part of the concern. It was obvious that they were not in the ordinary sense; and they could only be so if the Chamberlain held them as Trustee for the benefit of other shareholders. It stated: "There shall be transferred from each Company to the Board all liabilities in respect of any debenture stock or mortgage debt of such Company, and all other debts, liabilities, and obligations of such Company." In their judgment, the liability created by the Acts was an existing liability, and would be existing at the time of the transfer. It seemed obvious that the clause requiring the Company to transfer the whole of the property in their sinking fund, all the shares and all the debenture stock, to the Water Board was only consistent with the argument of the Company provided the Company were, under the terms and description of the undertaking, to be paid for it as part of their property. Then came the clause which put an end at the date of the transfer to the liability to contribute to the fund; and it had been argued by the Companies that it could not be said that this liability, which was extinguished by section 6, could be treated as existing under section 2. This argument was more subtle than real. The moment of transfer might be regarded from two points of view—as the *terminus ad quem* to the time which preceded it, or the *terminus a quo* to the time which followed it. Now the liability was existing before the Act of 1902 came into operation and down to the moment of the transfer. It was therefore, within the meaning of section 2, an existing liability. After the transfer, the liability ceased; and therefore, for the purpose of considering these two clauses, they must refer the moment of transfer round these two sides. The undertaking was defined by section 37; and they had to inquire whether the shares which were in the hands of the Chamberlain were or were not declared part of the concern. Could it be said that the shares standing in the name of the Chamberlain was property in the possession of the Company? They never received any of the dividends; they had no power of getting at the property. It was not in their possession; nor did it belong to them. Continuing, the President said that, in his view, the judgment of the Lord Chief Justice in Stebbing's case laid down the correct principle. It was intended to compensate the seller for what he lost—for the value to him, and not to the person acquiring. The very word "compensation" implied this; and it was the universal practice in ordinary cases of compensation to consider the value of the property in the hands of the seller. For these reasons, the Court concluded that the contentions of the Water Board were right. Passing to the consideration of the sterilization clause, the President said that they could not really advance very far at present, beyond expressing their view with regard to certain general propositions. As to advantages derived, one contention had been that there must be some advantage which was specific and separable from the general undertaking, and that the clause applied to such cases only. This was not the construction which the Court put upon it. It was obvious that cases in which such a specific and separable claim could be made must be very rare. The Court were therefore prepared to make a declaration that, in their judgment, the clause applied whenever powers had been given by Parliament to a company and had been exercised with advantage resulting to the undertaking as a whole. They conceived such advantage as being separable from the general undertaking, though not capable of being stated as a separate item of account. They were prepared to go further, and say that the mere possession of statutory power, if not actually exercised, if it were shown that it strengthened the position of the Company and increased the stability of the income of the Company, must be considered as an advantage within the meaning of the section. Whether or not the mere possession of power to borrow was such an advantage, was a point upon which they expressed no opinion. He did not think Mr. Moulton could carry it much further.

Mr. MOULTON said that was so. He understood that the application of the principle to each case must depend upon each case.

The PRESIDENT: Yes.

Mr. MOULTON then proceeded with the opening of the case on behalf of the Water Board. In the course of it, he referred to the assessments, which he said were in many cases too high.

The PRESIDENT: You surely will not ask us to go into the case of each house.

Mr. MOULTON said the point was a very important one. The difference of a shilling would make a very great difference if there were many houses so over-assessed. There was a tribunal to deal with such matters; but people would not appeal for the sake of a shilling. Of course, when a public body took the matter over, the assessments would probably have to be adjusted.

The PRESIDENT said that was all supposition.

Sir *Alexander Binnie*, the Chief Engineer to the Water Board, was the first witness called. In answer to Mr. J. D. FITZGERALD, he dealt with the figures of the East London Company. He stated that the breakdown of 1895 was due, not to scarcity of water, but to the condition of the Company's pipes.

Eighth Day—Tuesday, Nov. 3.

Sir *Alexander Binnie* was recalled to-day, and further examined by Mr. J. D. FITZGERALD. He said that in 1895 the East London Company pumped a larger quantity of water into the district than ever before; and what happened then might occur again in the case of a severe frost. It might be impossible, as Mr. Bryan had said, with regard to the mains relaid; but there were many which had not been altered. A large proportion of the leakage was caused, not so much by the mains of the Company, as by the intercommunication pipes which passed from the Company's mains. These burst literally in hundreds and thousands, and were liable to burst in any winter, and to subject the whole of the water system to the same strain that it had in 1895. Last year the daily average supply given by the Company was

40,177,000 gallons. These were the official figures of the Official Water Examiner, furnished to him by the Company. Out of this quantity, the Company obtained from the Southwark and Vauxhall Water Company 3,735,000 gallons per day, and from the Grand Junction and West Middlesex Companies 1,066,000 gallons per day. The Company were benefited by 2,492,000 gallons per day in consequence of the New River Company, who were authorized to draw an average of 22,500,000 gallons a day, only taking an average of 20,008,000 gallons. The Company were also benefited to the extent of 3,482,000 gallons a day by the Lea Conservancy not taking their full quantity of navigation water. The total amount thus received by the Company was, on an average, 10,775,000 gallons per day, which worked out to about 26 per cent. of the total average supply for the year 1902. It followed that 26 per cent. of their gross earnings last year came from sources which were not permanent. The present supply in a dry year from the River Lea, with all the existent storage, was 36 million gallons, including 10 millions from the Thames. Consequently, in a dry year, such as 1901-2, the supply of the Company would be about 40,176,000 gallons a day. He estimated that the population of the administrative district was stationary at 75,644, and the outside areas at an average increase of 58·5 per cent. in ten years. Starting in 1901, the total population was 1,379,883 gallons. He concluded that the population in 1914 would amount to 1,889,000. He had worked out the required supplies at from 30 to 35 gallons per head; and the average supply of the whole eight Companies in the past ten years had been 35·22 gallons. As to the probable cost of the future extensions, Mr. Bryan had estimated that in 1937 the population would be 2,472,000, and the quantity of water required would be 86,523,000 gallons per day, at a cost of £3,470,000. In 1902, the Companies claimed to have supplied 40,177,000 gallons daily. As the powers to carry out the works authorized in 1900 expired in 1907, no time should, in his opinion, be lost in commencing their construction. After this period, they would have to go to some outside source, or become still more dependent upon the Thames for their supply. Up to the present date, the expenditure on works, including the Lockwood and Banbury reservoirs, had been £3,846,000.

Mr. FITZGERALD: The estimate which Lord Balfour's Commission made was that 40 million gallons a day could be obtained from the wells in the Lea Valley?

Witness: Yes; but a good deal of information has been obtained since that Commission reported, and it shows a falling off in the water in the valley.

In your view, could 40 million gallons per day be relied upon as a permanent source of supply?—It could not.

The East London Company cannot rely on getting more than 10 million gallons a day from their wells in the Lea Valley as a permanent source of supply?—They could not.

Questioned on the subject of pollution in the Lea Valley, witness said that the purification of the valley had engaged the attention of various public authorities for the last forty years. All these had pointed to the fact that some means should be adopted to separate the sewage which flowed into the river from the water which was used for potable purposes. He had tested the district in June and July last. The river was polluted by sewage, gas refuse, and discharges. He had had experience of sewage farms, but had never smelt anything so disgusting as the odour emitted from the River Lea.

The PRESIDENT: Do you mean from the reservoirs?

Witness: No; from the filter-beds at Lea Bridge.

Mr. FITZGERALD: Is that a state of things which you, as a Water Engineer, can approve of as a source of supply for potable water?

Witness: Certainly not, in its present condition.

If you divert all the sewage effluent from the Lea, you purify it; but you proportionately reduce the supply?—You do; and I think that is one of the difficulties which the East London Water Company have to face.

In further examination, witness said there would be considerable difficulty in dealing with the question, both on the ground of reducing the flow of water and also of expense. If they diverted sewage from the river, the expense would be very considerable. One of the difficulties was the large volume of sewage discharged by some towns.

In cross-examination by Mr. BALFOUR BROWNE, witness said he did not know that the Hackney destructor was very close to the filters; but it was not a destructor he smelt. At first he thought it was a privy; but on examination there was no doubt that the smell came from the filters. The witness was cross-examined at great length with regard to the amount of water flowing down the Lea. He admitted that if certain assumptions made by Counsel were correct, his estimate was wrong; but he denied the accuracy of the assumptions.

Mr. BALFOUR BROWNE said he would call evidence to show that his assumptions were well founded.

In reply to further questions, witness said he was not aware that during the last eight years there had only been seven years' rain; but even if that were so, it would not account for the falling off of the water referred to, unless other circumstances were taken into consideration. Asked as to the basis upon which he had come to the conclusion that the Company must have an average of 30 gallons a head, he said he had taken 28 gallons, and added 2 gallons for future extensions. On it being put to him that most of the Companies had instituted a system of prevention of waste which had largely reduced the consumption, he acknowledged that some had done so. In further cross-examination, witness said that the Company had power to pump 15 million gallons a day from the wells; but they could not make this available for the whole of the year. They could not, in his opinion, get more than 10 million gallons a day from this source. It did not appear in the official record that the Company pumped 19½ million gallons a day during two months at the end of last year. If 3½ million gallons a day were pumped to waste, it would go into the Lea.

In re-examination by Mr. MOULTON, witness said that the failure of the supply in 1895 was due to the non-existence of reservoirs. There was an abundance of water if there had been reservoirs into which to pump it. He did not refer to the water drawn from the wells when he spoke of impurity.

Mr. *G. F. Deacon*, examined by Mr. FREEMAN, gave evidence with regard to the Lea Valley, the works of the Company, and the sources of supply. He said that in 1894 the Lea became lower than the Thames; the former being 28·58 per cent., and the Thames 29·48. This continued uniformly up to 1902, when the Lea had fallen to 17·9 per cent., against the Thames 24·87 per cent. If pumping from the wells was continued at its present rate, the flow of the Lea would be affected, and the supply reduced. The maximum amount obtainable from the Thames was 10 million gallons a day.

Mr. FREEMAN: Can you tell me the total amount the Company can fairly reckon upon from their three sources?

Witness: I estimate it at 33½ million gallons a day—15½ millions from the Lea, 8 millions from the wells, and 10 millions from the Thames, under the 1901-2 conditions of rainfall.

What ought to be the reasonable supply per head of the population?—Thirty gallons.

In reply to further questions, witness said the supplies of the Company last year were 40,270,000 gallons a day from their own sources; and this showed a deficit of 8 million gallons a day in the requisite supply. The water delivered to the consumers from the Lea was most unsatisfactory; but this arose from the excessive pollution of the sources, and not from the works of the Company.

In cross-examination by Mr. BALFOUR BROWNE, witness said his opinion that the water from the Lea was unsatisfactory was founded upon recent investigation, not his own. He was satisfied that the pollution of the Lea was increasing. He did not think that recent investigations showed that the raw water of the Lea was better than it used to be, as he understood that the samples were taken after half-treatment—that was, after subsidence; they were not taken from the Lea at all. He had put the consumption of water per head at 30 gallons per day. He did not say that this could not be reduced; but it could not be maintained, having regard to the constantly increasing use of water and the necessary growth in the trade supplies.

Ninth Day—Thursday, Nov. 5.

Mr. *E. Brough Taylor*, a Consulting Engineer, in answer to Mr. FREEMAN, gave evidence as to the quality of the sources of the Company's supply—viz., the River Lea at Keyde's Weir, the gravel beds at Hanworth, and the River Thames at Sunbury; as to the quantity of water available in the past and future; and as to the condition of the Company's existing works, especially with reference to the system of filtration adopted, and the want of duplication in the Company's well-pumping plant. The pollution of the waters of the River Lea and its tributaries took place over the whole watershed; but the grossest cases were due to the sewage outfall works, the contact of the water with town refuse, manufacturing and gas-works refuse, and garbage of all descriptions, and also to barge traffic, and bathing of human beings, cattle, and horses, &c. The effluents leaving the works, in the majority of cases, were very foul—little purification having taken place. He doubted whether the river would be appreciably worse if some of the sewage works were abandoned and the crude sewage allowed to flow direct to the river. If thoroughly efficient outfall works were substituted where the present works were inefficient, no doubt the condition of the river would be much improved; but there would still remain the highly-polluted water carried by the surface-water drains and the discharge from the river storm overflows. Extensive market gardening took place on the lower parts of the watershed, involving heavy manuring; and water flowing off such land carried with it the very grossest forms of impurity. The "Lea Navigation," from which the Company drew their supply, was a canalized channel, upon which there was considerable barge traffic carrying coal, town refuse, spent lime, manure, &c. Pollutions of a highly objectionable character resulted. The water of the Lea at Keyde's Weir could never be rendered a suitable source of supply.

Mr. FREEMAN: Then you are of opinion that the gravel beds at Hanworth are a dangerous source of supply?

Witness: Yes; and I believe it must be abandoned at an early date. Continuing, witness said he viewed with much apprehension proposals for large reservoirs in the Thames Valley to store the flood waters. The pollution in the watershed was increasing, and must continue to increase. The extreme limit of reservoir building in the Lea Valley would be reached by the construction of the two authorized reservoirs, giving storage to the extent of 7400 million gallons. This storage would, in a period of extreme drought, yield 23·5 million gallons daily, which he considered the full ultimate value to the Company of the overground Lea watershed. The utmost yield of the underground waters of the Lea Valley towards the end of a period of three dry years was 36 million gallons daily; but this quantity had never yet been obtained from the wells. At the present time, the water value of the Sunbury and Hanworth sources remained at 11 million gallons daily. He based his estimate of future requirements on 30 gallons per head per day, and estimated that in 1911 the consumption would be 52 million gallons daily, in 1921 70 millions, and in 1931 97 millions. The total powers of the Company amounted to 55 millions, which would last them till 1912. The new water required would be some two-and-a-half times as costly as the present supply; and the Company could not continue to work the undertaking at the same profit.

Cross-examined by Mr. BALFOUR BROWNE: Do you know whether the pollutions from all sources are greater or less than they were some years ago—take 1895?

Witness: I cannot express an opinion.

Can you tell me of any sources of pollution which exist now that did not exist then?—I cannot mention one offhand.

Mr. FREEMAN, in re-examination, was dealing with the point of impurity of supply, when

The PRESIDENT suggested that Counsel was labouring the point. The question for the Court seemed to be whether the water as delivered was pure.

Mr. *Joseph Parry*, Water Engineer to the Liverpool Corporation, in answer to Mr. HONORATUS LLOYD, generally confirmed the evidence given as to pollution. He said he had had exceptionally large experience in carrying out measures for the prevention of waste of water, and

confirmed Sir Alexander Binnie's evidence as to the tendency to rise after reductions had been effected. The daily consumption per head was 31¾ gallons in Liverpool at the present time. Twelve years ago, it was 24 gallons.

In cross-examination by Mr. BALFOUR BROWNE, witness said that the 31¾ gallons included everything—trades, hotels, lodging-houses, public washhouses, &c., and also salt water used for public purposes. The strictly domestic supply was 18·47 gallons.

Mr. *James Watson*, Water Engineer to the Bradford Corporation, examined by Mr. HONORATUS LLOYD, corroborated the evidence of the previous witnesses. The River Lea, from the intake of the New River Company down to Ponder's End, where the East London Company took their water, was very polluted indeed.

Sir *John Evans*, K.C.B., the Chairman of the Hertfordshire County Council, examined by Mr. FLETCHER MOULTON, said that the New River and East London Companies were now pumping many million gallons a day from the chalk cistern. As a consequence, the volume of the streams in Hertfordshire and of the River Lea had diminished, and during many months of the year the Chadwell Spring had ceased to discharge. He was of opinion that the well supply of the Companies, in the quantities at present taken, could not be maintained as a permanency.

Mr. BALFOUR BROWNE (in cross-examination): Has the Lea water got worse in recent years?

Witness: There is less of it.

Have you allowed more pollution to get into the stream?—We have done our best to keep pollution out; but I am not prepared to say successfully.

Mr. *Roger Gaskell Hetherington* also confirmed the evidence with regard to the pollution of the Lea.

Mr. *Hugh Kemsley*, a Land Agent, gave evidence with regard to the population in the Company's district. Walthamstow had an area of 4355 acres, of which 2180 acres were already developed. During the five years ending 1902, there were 7470 new houses and shops assessed to poor rate; the average assessment being only £15 8s. Another 25 years would absorb practically all the available building land in the parish. The area of Leyton was 2371 acres, of which about 1538 were already developed, and 250 acres were forest land. The area of West Ham was 4986 acres, of which about 4016 acres were developed. East Ham comprised 3344 acres, and its development had been very rapid. Barking had 4106 acres. Its development had been slow compared with Ilford and East Ham; but the improved train service and the electric tramway should render it popular with the working classes. Chigwell comprised 4136 acres; but he did not anticipate any extensive development there for some years. Wanstead had 1917 acres, Woodford 2146 acres, Buckhurst Hill 873 acres, and Loughton 3961 acres. The development of these districts was proceeding but slowly. Chingford had 2808 acres, and Waltham Holy Cross 11,017 acres. In both places building had not been very extensive.

Mr. *Edmund Broughton Barnard*, a Member of the Lea Conservancy and of the Metropolitan Water Board, in answer to Mr. FREEMAN, said that the portion of the River Lea from which the Company took their water was at present totally unfit for supply, on account of the pollution from trade effluents.

Dr. *Klein* gave a comparison of bacterioscopic examinations of East London water taken from various filters, water-posts, fountains, and stand-pipes, and analyzed by Dr. Macfadyen, Dr. Houston, and himself. The total number of bacteria in 1 c.c. of filtered water at the Company's works varied from as low as 2 to as high as 2000; both being from Essex well No. 1, Lea Bridge. In the filtered water as delivered, the total in 1 c.c. varied from 4 to 800; the former being from the Burdett Road stand-pipe, and the latter from the fountain in front of St. John's Church, Bethnal Green. The next highest was 523, from the water-post at Cambridge Heath Station.

Mr. BALFOUR BROWNE cross-examined witness with a view to showing that the bacteria were harmless in such quantities. The witness admitted that no epidemic had arisen, but said that no one knew what harm might have been caused in individual cases.

Tenth Day—Friday, Nov. 6.

The first witness called to-day was

Mr. *Urban Smith*, M.Inst.C.E., who said that the New River and East London Companies derived the whole of the water supplied by them, some 80 millions of gallons per day, from the valley of the River Lea, excepting a quantity of about 10 millions per day obtained by the East London Company from the Thames and a share of the water stored in the reservoirs at Staines to which the New River Company might be entitled. In his opinion, the material point for consideration was as to whether the two Companies could continue to abstract from the Lea Valley the same quantity of water as was now being taken. The Company's sources of supply were overtaxed. Having given a description of the chalk formation underlying the district, witness said that overlying the chalk was the formation known as the London clay. It was a well-known fact that pumping from the chalk under London had very much lowered the level of water in that formation. He held that pumping from the Companies' wells could not be maintained at its present quantity as a permanent source of supply. It was impossible to obtain direct evidence on this matter. The rainfall in the Lea basin was the alternate source of supply of the Companies. All the rainfall, except the portion which was evaporated, either flowed over the surface into the rivers or found its way into the subsoil, and went to supplement the underground supply. The Water Companies had for their use in the valley of the Lea both the water in the river and that underground. The total amount which could be obtained from these sources could not exceed the quantity of the rainfall *minus* the evaporation. The more the Companies pumped from the underground sources, the less water would flow down the river; and if they wanted more water from the river, they must lessen

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 352.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 15	10½	Alliance & Dublin 10 p.c.	18½—19½	..	5 7 8
100,000	10	,,	7½	Do. 7 p.c.	12½—13½	..	5 11 1
200,000	5	May 14	6½	Bombay, Ltd. . . .	5⅝—6	..	5 8 4
140,000	5	,,	6½	Do. New, £4 paid	4—4½	..	5 15 7
380,000	Stk.	Aug. 13	12	Brentford Consolidated	230—235	..	5 2 2
300,000	,,	,,	9	Do. New . . .	173—178	..	5 1 1
50,000	,,	,,	5	Do. 5 p.c. Pref. .	130—135	..	3 14 1
206,250	,,	June 11	4	Do. 4 p.c. Deb. .	105—110	..	3 12 9
220,000	Stk.	Sept. 11	10½	Brighton & Hove Orig.	207—212	..	5 1 5
246,320	,,	,,	7½	Do. A. Ord. Stk. .	145—150	..	5 3 4
460,000	20	Oct. 15	10	British.	38½—39½	+⅛	5 1 3
100,000	Stk.	Aug. 13	6	Bromley, Ord. 5 p.c. .	115—120	..	5 0 0
165,700	,,	,,	4½	Do. do. 3½ p.c. .	88—93	..	4 16 9
500,000	10	Oct. 15	7	Buenos Ayres (New) Ltd.	10⅛—10⅝	..	6 10 3
250,000	Stk.	June 26	4	Do. 4 p.c. Deb.	93—95	..	4 4 3
150,000	20	July 10	8½	Cagliari, Ltd. . . .	22—24	..	6 17 6
100,000	10	June 11	10	Cape Town & Dis., Ltd.	14½—15½	..	6 9 0
50,000	50	Nov. 3	6	Do. 6 p.c. 1st Mort.	52—54*	+3	5 11 1
1,375,000	Stk.	Aug. 27	5⅝	Commercial 4 p.c. Stk.	105—108	..	4 16 3
503,750	,,	,,	5	Do. 3½ p.c. do.	99—102	..	4 18 0
442,947	,,	June 11	3	Do. 3 p.c. Deb. do.	87—90	..	3 6 8
800,000	Stk.	June 11	7	Continental Union, Ltd.	118—123	..	5 13 10
200,000	,,	,,	7	Do. 7 p.c. Pref.	135—140	..	5 0 0
575,000	Stk.	Aug. 27	5½	Crystal Palace Ord. 5 p.c.	112—117	..	4 11 1
60,000	,,	,,	5	Do. 5 p.c. Pref. .	118—123	..	4 1 4
112,533	,,	July 10	5	Do. 5 p.c. Deb. Stk.	135—138	..	3 12 6
486,090	10	July 29	10½	European, Ltd. . . .	17⅞—18½	..	5 13 6
354,060	10	,,	10½	Do. £7 10s. paid	12½—13½	..	5 16 8
15,243,200	Stk.	Aug. 13	4⅛	Gas-light and Coke { 4 p.c. Ord. . .	85—87	−1	5 1 2
2,600,000	,,	,,	3½	3½ p.c. max. .	86—88	..	3 19 7
3,799,735	,,	,,	4	4 p.c. Con. Pref.	104—107	..	3 14 9
4,193,975	,,	June 11	3	3 p.c. Con. Deb.	87—89	..	3 7 5
258,740	Stk.	Sept. 11	5	Hastings & St. L. 3½ p.c.	90—95	..	5 5 3
70,000	10	Oct. 15	8	Hongkong & China, Ltd.	15—16	..	5 0 0
3,800,000	Stk.	May 14	10	Imperial Continental .	203—206	+2	4 17 1
473,600	Stk.	Aug. 13	3½	Do. 3½ p.c. Deb. Red.	99—102	..	3 8 7
165,242	Stk.	Aug. 27	6	Lea Bridge Ord. 5 p.c.	113—118	..	5 1 8
561,000	Stk.	,,	10	Liverpool United A .	214—216	..	4 12 7
718,100	,,	,,	7	Do. do. B .	163—165	..	4 4 10
306,083	,,	June 26	4	Do. do. Deb. Stk.	110—112	..	3 11 5
75,000	5	June 11	5	Malta & Medn., Ltd. .	4¼—4⅜	..	5 5 3
550,000	100	Oct. 1	5	Met. of Melbourne { 5 p.c. Deb.	101—105	..	4 15 3
250,000	100	,,	4½	4½ p.c. Deb.	100—102	..	4 8 3
541,920	20	June 11	3½	Monte Video, Ltd. . .	9—10	..	7 0 0
1,515,892	Stk.	Aug. 13	4½	Newc'tle & G'tesh'd Con.	104½—105	+⅛	4 5 9
376,855	Stk.	July 3	3½	Do. 3½ p.c. Deb.	96⅞—97½	..	3 11 10
300,000	Stk.	May 14	8	Oriental, Ltd. . . .	140—145	..	5 10 4
600,000	5	Sept. 30	7	Ottoman, Ltd. . . .	5⅞—6⅛	..	5 7 8
					* Ex div.		

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
205,005	Stk.	June 26	6½	Ply'mth & St'house 5 p.c	123—128	..	4 15 8
851,070	10	Oct. 15	7	River Plate Ord. . .	10⅝—11⅛	..	6 4 5
300,000	Stk.	June 26	4	Do. 4 p.c. Deb..	94—96	..	4 3 4
250,000	10	Sept. 30	8	San Paulo, Ltd.. . .	10⅛—11⅛	−⅛	6 19 2
135,000	Stk.	Sept. 11	10	Sheffield A	239—241	+1	4 3 0
209,984	,,	,,	10	Do. B	239—241	+1	4 3 0
523,498	,,	,,	10	Do. C	239—241	+1	4 3 0
116,106	Stk.	Sept. 30	5	Shrewsbury Ord. 5 p.c.	103—112	..	4 9 3
6,150,000	Stk.	Aug. 13	5⅛	South Met., 4 p.c. Ord.	117—120	..	4 8 10
1,780,000	,,	July 10	3	Do. 3 p.c. Deb. . .	87—90	..	3 6 8
380,940	Stk.	May 14	5	Southampton Ord. . .	105—110	..	4 10 11
87,950	,,	July 10	4	Do. 4 p.c. Deb.	102—105	..	3 16 2
120,000	Stk.	Aug. 27	6	Tottenham and Edmonton { A. 5 p.c.	115—120	..	5 0 0
313,020	,,	,,	4½	B. 3½ p.c.	95—100	..	4 10 0
182,380	10	June 11	8	Tuscan, Ltd.. . . .	8—9	..	8 17 10
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	58—100	..	5 0 0
737,142	Stk.	Aug. 13	5	West Ham, 5 p.c. Ord.	93—58	..	5 2 0
				WATER COMPANIES.			
780,776	Stk.	June 26	11⅓	Chelsea, Ord. . . .	300—310	..	3 14 2
150,000	,,	,,	5	Do. 5 p.c. Pref. .	145—148	..	3 7 7
160,000	,,	,,	4½	Do. 4½ p.c. Pref. '75	132—137	..	3 5 8
175,785	,,	Sept. 30	4½	Do. 4½ p.c. Deb. .	135—140	..	3 4 4
1,720,560	Stk.	Oct. 15	8	East London, Ord. .	203—208	..	3 16 11
654,740	,,	June 11	4½	Do. 4½ p.c. Deb. .	138—143	..	3 2 11
1,282,943	,,	,,	3	Do. 3 p.c. Deb. .	92—95	..	3 3 2
700,000	50	June 11	10	Grand Junction { 10 p.c. max..	120—125	..	4 0 0
310,000	Stk.	Sept. 30	4	4 p.c. Deb..	120—125	..	3 4 0
708,000	Stk.	Aug. 13	10	Kent	275—285	..	3 10 2
160,000	,,	,,	7	Do. New, 7 p.c. max..	185—195	..	3 11 10
1,043,800	100	June 26	11	Lambeth, 10 p.c. max..	285—295	..	3 14 7
406,200	100	,,	8½	Do. 7½ p.c. max..	210—220	..	3 17 3
350,000	Stk.	Sept. 30	4	Do. 4 p.c. Deb..	120—125	..	3 4 0
500,000	100	Aug. 13	12⅛	New River, New Shares	380—390	..	3 5 7
1,000,000	Stk.	July 29	4	Do. 4 p.c. Deb..	121—124	..	3 4 4
902,300	Stk.	June 11	7½	South-wark and { Ord. . .	228—233	+1	3 4 4
126,500	100	,,	7½	7½ p.c. max.	200—210	..	3 11 5
489,200	Stk.	,,	5	5 p.c. Pref. .	145—150	..	3 5 6
1,019,585	,,	Oct. 15	4	Vauxhall { 4 p.c. A Deb.	120—125	..	3 4 0
1,155,066	Stk.	June 11	10	West Middlesex. . .	265—275	..	3 12 9
200,000	,,	,,	4½	Do. 4½ p.c. Deb. .	133—138	..	3 5 3
200,000	,,	Sept. 11	3	Do. 3 p.c. Deb. .	92—95	..	3 3 2
					* Ex div.		

their pumping. It was impossible to have increased supplies from both. It was clear, in his opinion, that the Companies could not augment the amount of water obtained from the Lea Valley by pumping increased quantities from the chalk without pumping from storage, and so further reducing the quantity to be obtained in the future. Their present well supply could not be regarded as one which would continue to give them the quantities of water which they were obtaining from their wells at the present time.

Mr. BALFOUR BROWNE, in cross-examination: I believe your evidence before the Balfour and Llandaff Commissions was to the same effect as that you have given to-day?

Witness: It was on the same lines.

You failed to convince those Commissions?—On some points.

On the main points?—Yes; you may take that as so.

The witness was next cross-examined with reference to tables he had put in his evidence as to the average daily flow of the River Lea, the average yearly rainfall, the average winter rainfall, and also the flow of the Chadwell spring, and the yield. He said the spring fell off very much when the rainfall was deficient. There was no doubt the spring went up and down with the rainfall like everything else; but it continued to go down on the whole—the average continued to go down.

Mr. BALFOUR BROWNE: It has only gone down in the periods of drought. I have compared the years 1882 and 1883 with 1888 and 1889, and they are the same?

Witness: Yes; they are.

On the question of always going down—the flow of the river, the yield per day, &c.—this was put in, I suppose, to show the effect of pumping?—It does show it.

Mr. BALFOUR BROWNE: I say it does not.

The PRESIDENT: How do you get the yearly rainfall in the Lea Valley—from what source?

Witness: From the tables published in the natural history transactions of Hertfordshire; and these tables will be proved by the gentleman who collects them.

Mr. BALFOUR BROWNE: You say the chief cause of the decline in the Lea is due to our pumping?

Witness: It must be so.

By the PRESIDENT: He believed that all rivers throughout the country were slightly declining; and the information was that the Lea was declining at a very rapid rate.

Professor *H. N. Dickson*, of Oxford, said he had visited a large part of the area under consideration; and he gave further evidence respecting the rainfall in the River Lea watershed, the percentage of catchment, &c. It appeared from tables he produced that 92 per cent. of the catchment area was more than 100 feet above Fielde's Weir, and nearly 58 per cent. more than 200 feet above it. The water received as rainfall over the wide upland region drained to a very restricted area.

The PRESIDENT: Do you say that during the last three years the rivers of England, as a whole, have been lower than ever before?

Witness: I am not aware that this is the case; but we have the peculiar fact that the rainfall during the last twenty years has been somewhat below what is regarded as the general average. My opinion, however, is that this deficiency has not increased. It was as great twenty years ago as five years ago.

Do you think that in all probability the rivers of England do flow less freely?—Yes.

Mr. *B. Cole*, a member of the Bedfordshire County Council, said the supply of water from the Lea had diminished badly during the last 30 or 35 years, irrespective of seasons. By that he meant wet seasons. He believed this was due to the water being diverted; the deep wells drained the watershed. He knew of nothing else to account for it.

Mr. BALFOUR BROWNE: Do you know that the first drop of water pumped by the East London Company was in 1886?

Witness: There were deep wells before that time; but I cannot tell whose they were.

Do you know that the first water pumped by the New River Company was in 1881?—No.

Mr. *John Barker*, a farmer, said the River Mimram had been steadily decreasing very noticeably for the last ten years, though he admitted it was fairly full just at present.

Dr. *J. Clough Thresh*, Medical Officer of Health to the Essex County Council, said that for many years he had made a special study of the subject of water supplies generally, and of Essex in particular. He proceeded to give evidence to the effect that the Lea water was fouled by barges, sewage effluents, the discharges from ditches conveying sewage and manurial matter from farms and houses, and by surface water from manured ground. The population in the Lea Valley was rapidly increasing, and market gardens were becoming multiplied. Both of these must add to the amount of polluting matter entering the river. The danger arising from sewage was well known, but a recent epidemic in Chelmsford, which caused 1400 cases of diarrhœa and 14 deaths, showed that impurities washed from cultivated soil might also cause disease when introduced into a public water supply. The River Lea, therefore, could not be considered a satisfactory source of supply; and any attempt to radically improve it would entail an enormous outlay, and seriously curtail the amount of water which could be abstracted from the river. Without more water, the development of the county would be greatly impeded. It was very probable that the future "Garden City" would have been in Essex had a sufficiency of water been available.

Mr. BALFOUR BROWNE: Do you know that, since the South Essex Water Bill of last year, South Essex have got leave to sink further wells close to the East London wells? Do you know that this was not opposed by the County Council of Essex?

Witness: I do not know why they should oppose it.

Other evidence was given by Mr. *Binnie*, by Dr. *Allan Macfadyen*, Principal of the Bacteriological Department at the Lister Institute of Preventive Medicine—who confirmed the evidence of Dr. Klein as to the undesirable state of the filtered water of the Rivers Lea and Stort—and by Mr. W. *Plender*, an Accountant, who said that during the last

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fifty years the dividend of 8 per cent. of the Company had only been reached six times. It had fluctuated between 6 and 8 per cent.

Eleventh Day—Saturday, Nov. 7.

Mr. *William Plender*, in further examination by Mr. J. D. FITZGERALD, put in a table showing the annual profit during the ten years ending Dec. 25, 1902. The amount retained by the Company for management under the Acts of 1894 and 1897, before the payments were made to the City Chamberlain, aggregated £17,728; and he had deducted one-tenth of this, bringing the average net profit to £124,600. He did not say that this income was maintainable.

In answer to Sir EDWARD FRY, Mr. FITZGERALD pointed out that the statute set forth that no credit for the 1 per cent. for management was to be taken by the Company in case of purchase.

The witness put in another table showing that the total capital expenditure up to the present time was £3,829,337. It had been largely increasing of recent years. During the last five years, £816,959 had been spent, or an average of £163,392 per annum; and in the last ten years, the sum was £1,325,515, giving a yearly rate of expenditure of £132,551. Another table showed that during the whole fifty years the dividend of 8 per cent. had only been reached on six occasions. The assessment of the Company's property had risen from £122,649 in the year 1891, to £154,106 in 1902. The amount paid for rates rose from £25,554 in 1891 to £48,696 in 1902. The rate was 4s. 2d. in the pound in 1891, and rose in 1902 to 6s. 3½d. The net income required with the present issued capital, disallowing the 1 per cent. for management, to pay a 10 per cent. dividend, would be £210,511. In the Company's claim, they put it that with a net income of £172,000 they could pay 10 per cent. The £172,000 would pay 10 per cent; but in addition there would be a contribution of £26,251 to the sinking fund, making a total of £198,307; and the 1 per cent. added £12,204.

Sir JOHN WOLFE-BARRY asked why, on the assumption that the Company was a concern paying dividend, £12,204 was deducted for the 1 per cent.

Mr. BALFOUR BROWNE said it should not be excluded.

Mr. FITZGERALD said the figures showed that the Company, if they were going on, could pay 10 per cent. with a net income of £198,307. If they were to be valued for purchase on this basis, they must show an income of £210,511 in order to cover the 1 per cent.

In answer to further questions, witness said that it was a safer method to take an average of years than to take a single year; and in the present case the former would be more favourable to the Company. The gross income had increased from year to year—from £287,000 in 1893, to £401,000 in 1902. The interest and sinking fund had grown to a greater extent.

Mr. *H. E. Haward*, Comptroller to the London County Council, put in tables showing the approximate estimates of future gross water-rental and trading profits, based upon the accounts of the ten years ending 1902, and estimates of charges for interest and sinking fund. No account was taken in the tables of the effect of the sterilization section. The actual gross water-rental, less empties, &c., in 1902 was £398,376. In 1910, he estimated it would amount to £494,989. In 1902, the actual profit on trading was £196,499; the estimated profit in 1910, £239,080. Less interest charge and sinking fund based on possible dividends, 1902, actual balance subject to depreciation, £121,227; being at the rate of 7·05 per cent. Estimated balance, 1910, £99,195, at the rate of 5·76 per cent.; the interest charge having risen from £69,521 to £119,165, and the sinking fund from £5751 to £20,720. In 1914, he estimated the rate would sink to 5·47 per cent.; the balance available, subject to depreciation, being £94,091. He pointed out that the average percentage of the maintenance and management expenses in relation to income for the ten years ending 1902, apart from the cost of purchasing water, was 4·36 per cent. more than for the ten years ending 1892. It was assumed that the expenses would, on the average, increase by 0·4 per cent. each year, and that the profit on trading would correspondingly decrease each year by 0·4 per cent. of the gross water-rental, less empty houses, &c. Taking the estimated net profits in the years 1903 to 1910 on the basis of the net water-rentals shown in Mr. Bryan's table, but calculating expenses, interest, and sinking fund, as in his own table, the balance available in 1910 would be £90,008, at the rate of 5·23 per cent.

Witness put in a table comparing the prices of, and yield to, an investor at these prices in Consols, London County Council 3 per cent. consolidated stock, East London 3 per cent. debenture stock, and East London ordinary stock, in 1902 and on Oct. 31, 1903. Upon the latter date, the equivalent number of years' purchase to the price of Consols was 35¼, of London County Council 3 per cent. consolidated stock 31⅛, the East London Company's 3 per cent. debenture stock 31½, and East London ordinary stock 25⅝, as against the mean in 1902 of 34½, 33⅛, 32½, and 27 respectively. Another table gave the monthly prices and yield per cent. of the East London Company's ordinary stock from January, 1893, to September, 1903, and the average yearly yield per cent. The latter was as follows: 1893, £3 15s. 8d.; 1894, £3 11s.; 1895, £3 10s. 3d.; 1896, £3 1s.; 1897, £3 2s. 1d.; 1898, £3 7s. 10d.; 1899, £3 6s. 9d.; 1900, £3 11s. 5d.; 1901, £3 12s. 6d.; and 1902, £3 11s. In 1903, the yield was: January and February, £3 9s. 9d.; March, £3 9s.; April, £3 7s. 6d.; May, £3 6s.; June, £3 5s.; July, £3 6s.; August, £3 18s.; and September, £3 17s.

Mr. *H. L. Cripps*, Parliamentary Adviser to the Metropolitan Water Board, put in a number of tables giving information on the issue of debenture stock by the Company, the average rate per cent. of interest paid, and calculations as to future water supply.

Professor *Dewar*, in reply to Mr. CRIPPS, said he accepted the position of Analyst to the Company in 1892, on the understanding that they adopted the bacteriological method as a means of ascertaining the mode in which they conducted their filtration. This had been adopted by him with all possible precaution.

The PRESIDENT: As the witness was called at our suggestion, we wish to hear whether he agrees generally with the evidence of Sir

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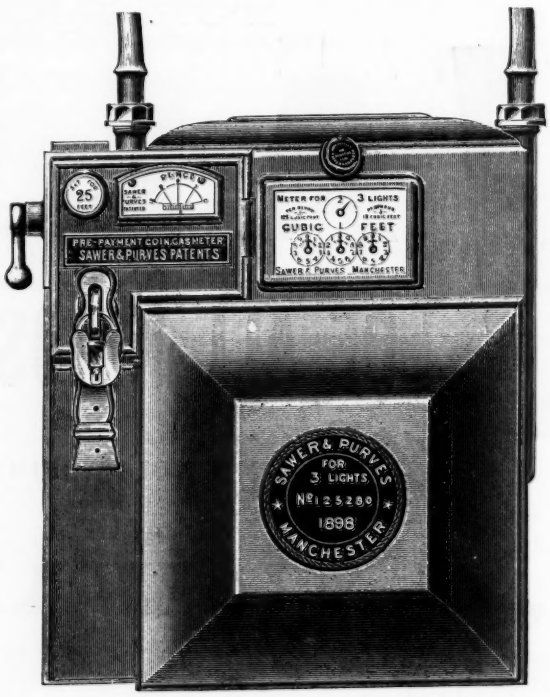

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MANCHESTER
AND
NOTTINGHAM.

IT HAS INCREASED IN RATIO TO THE ABOVE, SINCE THE POPULARITY AND PRE-EMINENCE OF THE "POSITIVE" SLOT METER BECAME PRONOUNCED.

William Crookes, and whether he has any comment to make upon the evidence of Dr. Klein.

Mr. CRIPPS: Do you say that since 1892 there has been an improvement in the character of the water?

Witness: Yes. There has been no deterioration, but improvement with filtration. Before the Balfour Commission, we had evidence of 20 years' experience of analysis by Sir Edward Frankland that the water of the Thames was the same. We have had ten years' experience; and we say there has been no deterioration. Continuing, witness said, with reference to the evidence of Dr. Klein, that there had been nothing new since 1895. There had been improved bacteriological methods. Dr. Klein had drawn attention to a large proportion of *B. coli* in 1895 in a report to the London County Council. But there had been nothing new since. He did not suggest that Dr. Klein was not a good bacteriologist; but Sir William Crookes and himself drew their samples and followed rigidly the bacteriological method in the first instance as a test of filtration. It was a most severe test, and the nearest approach they could make to spring water by artificial methods. They collected their samples, put them in ice, and took them to the laboratories, where they were examined. He did not think that Dr. Klein's method was sufficiently precautionary. With the knowledge already attained, the microbic impurity could be reduced to a state of being sterile.

In cross-examination by Mr. MOULTON, witness said that in October last the samples did not contain any *B. coli* within the range of 30 c.c. He refused to allow Counsel to examine the laboratory books, but said certain information from them was available There was a chemical as well as a bacteriological examination made, giving the organic carbon, on the method of Sir Edward Frankland.

In reply to Sir JOHN WOLFE-BARRY, witness said that the opinion of Sir Edward Frankland, as expressed before the Balfour Commission, was that while at the time he was doubtful as to the possibility of filtration making the water of the Thames sufficiently free from all danger, he thought the Lea would be perfectly good. Afterwards, he turned round completely, and thought it was impossible to abandon the source of the Thames as the finest water supply of the United Kingdom, from his knowledge of filtration.

Mr. BALFOUR BROWNE expressed his intention of recalling Mr. Bryan, but stated that it was impossible to adequately examine him that day. For one thing, there were certain tables which had to be prepared. The Water Board should have copies of them on Thursday next. He therefore applied for an adjournment till that day.

Mr. MOULTON opposed the application.

The PRESIDENT acceded to Mr. Balfour Browne's request; and as it had previously been decided, on the application of Mr. Moulton, not to sit this week, the Court adjourned till Monday next (Nov. 16).

The Directors of Meters Limited have declared interim dividends at the rates of 5½ per cent. per annum on the preference shares, and 5 per cent. per annum on the ordinary shares.

ELECTRIC LIGHT QUESTION AT DORCHESTER.

Victory for the Opponents of the Scheme.

In the "JOURNAL" last week, we noticed the proceedings at a public meeting held at Dorchester to consider the question of the advisability of the Corporation undertaking electric lighting. The result, it may be remembered, was directly opposed to this course. It was a most unequivocal expression of opinion on the part of the ratepayers; and it was followed up by another at the elections, which has put the *quietus* upon the scheme. To have or not to have municipal electric lighting was the test question; and the battle was fought with spirit on both sides. We learn from a local paper that besides the addresses of the ten candidates, abundance of election literature had been distributed in the form of manifestoes and counter-manifestoes. The great public meeting in the Corn Exchange, referred to above, was promptly followed by a counter-blast in the form of an address issued to the electors signed by the thirteen members of the Council—the bare majority—adhering to the Council's scheme. This provoked a rejoinder from the Ratepayers' Protection Society, urging the electors not to be "led away" by these people, and declaring that their address was "absolutely misleading." The Society gave statistics of 93 towns, with populations of less than 100,000 inhabitants in their area of supply, which last year suffered a net aggregate loss on their electric lighting undertakings of £11,012. The address closed by exhorting the electors to put new blood into the Corporation by voting "solid" for the Society's four nominees. One of these was Mr. G. Wood Homer, who seconded the motion which was carried with such an overwhelming majority at the ratepayers' meeting; and he went in at the top of the poll for the Central Ward. Dr. Cousens, the representative of the West Ward, has all through been an uncompromising advocate of the municipalization of the electric light; and he went to the electors on this point alone. He asked them to state definitely whether or not they wanted the new light as a municipal undertaking. The invitation was a challenge; and it was taken up in a manner that removed all doubt, if any existed, as to what his constituents—a large proportion of whom would have no other privilege as regards the light than help to pay for its use by residents in the more central part of the town—think of the proposal. They replied to his invitation by declining to re-elect him, and choosing one of the Society's nominees instead. The result of the polling is that the new Council, instead of containing a majority for the scheme, shows one against it—eleven to thirteen. Alderman Duke, who was Chairman of the Electric Lighting Committee in the old Council, has been much criticized for his "inconsistency" in changing from an advocate to an opponent of the electric lighting scheme. But it was because he found it to be unsound, and to contain all the elements of a ruinous speculation, that he not only withdrew his support from it, but urged all the ratepayers to do likewise. The town owes him its thanks for his exhibition of manliness, which has no doubt saved them from the burden of heavier rating.

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ADDRESS:

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A BIG WATER SCHEME FOR SKIPTON.

The question of providing an additional water supply has for a considerable time past been engaging the attention of the Skipton Water Committee; and at a meeting of the Urban District Council last Thursday, they presented a long report which dealt with a proposal to utilize the Embsay and Eastby streams. In it, the Committee state that from the Embsay stream alone there can be obtained a plentiful supply of water, quite sufficient for the needs of Skipton for many years to come; and that in the township of Embsay-with-Eastby, at the foot of Embsay Moor, there is an excellent site for a reservoir at an altitude of 700 feet above Ordnance datum, or nearly 200 feet higher than the town's present reservoir. The Committee have had an interview with the Duke of Devonshire's Agents with respect to the land; and it has resulted favourably. They have obtained the advice and assistance of their Consulting Engineer, Mr. George H. Hill, who has inspected the site and reported favourably with regard to it. Professor Boyd Dawkins has also visited the spot and reported favourably. The drainage area of the proposed reservoir is upon Embsay Moor, and contains about 600 acres. After providing compensation water to be turned down the stream, the Committee are informed that there will remain available for consumption about 440,000 gallons per day, which will afford an ample supply. The Engineer advises the construction of a reservoir capable of holding 120 million gallons; and he estimates the total cost of the works at about £66,000. Added to this sum there will be the parliamentary, legal, and engineering expenses, which will bring the total to £72,000. This will include the cost of the construction of the reservoir, with all incidental works, such as the main from the reservoir to the town of Skipton. The Committee do not recommend the Council to take any steps at present with the view of utilizing the Eastby stream, for the reasons that there is not a suitable site for a sufficiently large reservoir on the Eastby stream.

COMPARATIVE COST OF GAS AND ELECTRICITY.

Some Figures from Bristol.

An interesting comparison of the cost of gas and electricity has been published in a letter written by Mr. John Phillips, the Secretary of the Bristol Gas Company, to the "Bristol Times and Mirror." Mr. Phillips, after calling attention to the fact that his Company have to compete with the Corporation Electrical Committee, backed by the rates, objects strongly to a statement made in an advertising pamphlet issued by the Committee to the effect that "for comparison with gas-burners, it may be assumed that an 8-candle power lamp will usually supply the place of a 4-feet gas-burner. He remarks that there is no need for assumption, as the truth or otherwise of the assertion can be easily demonstrated; and this he proceeds to do as follows.

"The mode of testing the illuminating power of gas is laid down by Act of Parliament; and in Bristol the Official Inspector is appointed by the Corporation. His tests, therefore, are independent of the Gas Company, and must be accepted as correct. The test is made by using a standard burner consuming 5 feet of gas per hour. According to the Inspector's tests, extending over a long period, Bristol gas has given, with the 5-feet burner, an average illuminating power of 15·30 candles, equal to 3·06 candles per foot of gas consumed. Therefore, a 4-feet gas-burner gives an illumination of 12¼ candles, not 8 candles as stated in the pamphlet—only a difference of 53 per cent. Further, the electric lamp is the most perfect form of indoor electric lighting yet found, and, in common fairness, should be compared with the most improved form of gas lighting—viz., incandescent burners. Here I cannot quote official figures; but I will give the results claimed by the makers, and confirmed by eminent photometrists.

"A No. 4 Kern burner, consuming, without bye-pass, 4 cubic feet of gas per hour, gives a light of 100 candles. The 'C' burner, usually adopted for indoor domestic lighting, consumes slightly under 4 feet per hour, and gives a light of 60 candles. The comparison therefore is:

Electric lamp	8 candles
Flat-flame gas-burner	12¼ ,,
'C' incandescent gas-burner	60 ,,
Kern incandescent gas-burner	100 ,,

"Now for cost. Professor J. A. Fleming, one of the greatest authorities on electric lighting, says that 1 unit of electricity will keep an average 16-candle lamp going for 18 hours. Therefore 1 unit in an 8-candle lamp should burn 36 hours—though I believe it does not last so long. I will, however, take the figures. The charge for electricity in Bristol is, to the average consumer, 5d. per unit. The charge for gas to the average consumer is 2s. 3d. per 1000 cubic feet. If we take 1000 hours as the aggregate consumption for each burner, we find that, for this period, 28 units of electricity will be consumed by an 8-candle lamp, and 4000 feet of gas by a 4-feet burner.

	Per c.p. per 1000 Hours.
28 units at 5d. equal 11s. 8d. for a light of 8 candles, or	17·50d.
4000 feet of gas at 2s. 3d. equal 9s. for a light with—	
Ordinary flat-flame burner of 12¼ candles, or	8·82
'C' incandescent burner of 60 candles, or	1·80
Kern incandescent burner of 100 candles, or	1·08

"So that, light for light, electricity is about twice the cost of gas consumed through the flat-flame burner, about 9¾ times the cost of gas consumed through the 'C' incandesdent burner, and about 16¼ times the cost of gas consumed through the Kern incandescent burner. For incandescent lighting, the cost of mantles must be added. The retail price of the best is 6d. each; and two, with careful use, should last a year. In electric lighting, the cost of the renewal of lamps must be added. The relative cost of installation and maintenance has to be considered; and here, again, gas has the advantage."

CARBURETTED WATER-GAS APPARATUS

Merrifield—Westcott—Pearson Patents.

The Economical Gas Apparatus Construction Co., Ld.

W. H. PEARSON, Chairman.
W. H. PEARSON, Junr., Deputy-Chairman.
J. T. WESTCOTT, Manager.
L. L. MERRIFIELD, M.Inst.M.E., Engineer.

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CARBURETTED WATER-GAS ENGINEERS.

The above Company have erected since 1893, or are now erecting, their Universal Type of Carburetted Water-Gas Plant at the following Gas-Works:—

	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily.
BLACKBURN	1,250,000	ST. CATHERINES (Remodelled)	250,000	ACCRINGTON	500,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	TONBRIDGE	300,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	STRETFORD	500,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	OLDBURY	300,000
BIRKENHEAD	2,250,000	ST. CATHERINES (Second Contract)	250,000	TODMORDEN	500,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	YORK (Second Contract)	750,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	ROCHESTER (Second Contract)	500,000
HALIFAX	1,000,000	YORK	750,000	NEWPORT (MON.)	250,000
TORONTO	250,000	ROCHESTER	500,000	TOKIO, JAPAN	1,000,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	PERNAMBUCO (Brazil)	125,000
LINDSAY (Remodelled)	25,000	CRYSTAL PALACE DISTRICT	2,000,000	MALTON	150,000
MONTREAL	500,000	DULUTH, MINN.	300,000	DULUTH, MINN. (Second Contract)	300,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	BROCKVILLE (ONT.)	250,000
BELLEVILLE	250,000	LEICESTER	2,000,000	SMETHWICK	500,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	GRAVESEND	300,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	NEWPORT MON. (Second Contract)	250,000
		BURNLEY	1,500,000	TORONTO (Third Contract)	750,000
		KINGSTON-ON-THAMES	1,750,000	TORONTO (Fourth Contract)	1,000,000

Complete Gas-Works at NELSON, BRITISH COLUMBIA.

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.
MONTREAL, ONT. (Second Contract) . . . . . 1,800,000 Cub. Ft.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

Two things have happened in Scotland this week, from which, when read together, may be derived a most cogent warning regarding a danger which may be found in some phases of municipal activity. Last night a fire broke out in a range of gigantic warehouses in Buchanan Street, Glasgow; and in the space of three hours damage was done to the amount of, it is estimated, £120,000. On Thursday, in the Second Division of the Court of Session, decree was given against the Corporation of Falkirk in an action brought by a member of the Corporation to recover damages in respect of the flooding of his works as the result of a thunder shower in July, 1902. The Court held that there had been negligence on the part of the Corporation, in their not seeing to the sewage system being kept clear of obstruction. There is a great outcry in Falkirk over a litigation which will result, with costs, in a loss of £3000 upon a community who consider themselves already overburdened. The Glasgow catastrophe was the result, it is believed, of the fusing of an electric wire. I find that in all the accounts I have been able to see of the matter, the origin of the fire is never alluded to, except in one newspaper, in which the electric wire theory is given. I have before commented upon the disappearance in recent years, from reports of fires, of the cause of origin being given. This is a subject upon which I speak with authority, because, in the course of many years' experience, I have hundreds of times inquired into this particular item relating to fires, as part of a well-established rule of working. I suppose it will be easy to admit that it would be unpalatable to those who supply current to have it announced that such a dire disaster as this in Glasgow was the outcome of a defect in the electric light arrangements. This observation has all the more force when the supply of electricity is in the hands of the Corporation. Fire brigades are Corporation servants; and it would be, to say the least of it, unsavoury conduct on the part of one department to do anything which might check the growth of another. I assert that, whether it be of intention, or whether it be on account of the greater subtlety of fire causes, we are not so fully informed upon the subject of origin as we used to be; and when, as in the case of this Glasgow fire, we find that, deriving their information from a common source, only one newspaper ventures to give the reason which was authoritatively furnished to them, it is proved that there is a desire to put out of view what might not be appreciated by the Electric Light Committee. The decision in the Falkirk case comes in with great pertinence here. If the Corporation of that borough are held liable for loss arising through an extraordinary strain being put upon a sewer, it is not a far cry to the holding of the Corporation of Glasgow liable for loss arising through a defective electric light fitting. The deficit in the working of the Glasgow Corporation Electricity Department last year was over £13,000. If fire claims come to be made a charge upon the department, when may the day arrive when deficits will be unknown? We may say, "Never." In writing this, I fully realize that the extent of the risk, which may not be new, but which is certainly emphasized by the Falkirk decision, will depend greatly upon the extent of the service which the Corporation provide. Liability will only go so far as the Corporation themselves go. If they stop short when they reach the boundary of the customer's premises, they will not be responsible for anything which may happen inside. But if the Corporation, by themselves or by arrangement with companies or contractors, extend their control over the wiring of interiors, they cannot escape the consequences of defect in such work. It is here that the warning note must be raised. The Corporation of Glasgow do not wire premises; but they supply "lamps and fittings" in connection with a change of voltage, and they have power to hire out motors and accessories. In all of this there is room for much liability, according to the terms of the agreements with the customers. There is need for great caution in all these matters. The lesson of the Falkirk case has little applicability to gas supply, because of the universal practice of only laying service-pipes to the premises of the consumer, and leaving it to someone else to carry the piping through the premises. We have heard regrets expressed that the gas manager has not full control of the supply to the point of ignition. In view of the responsibilities which such a policy would carry, it will probably be much safer for corporations and companies that they should not have such power.

The Corporation of Falkirk seem to go from one trouble into another in connection with the proposal to erect new gas-works for the town. It was but last week I mentioned that they had selected the Thornhill site for the new works. Now it would seem that, before the new works are erected, there must be another delay, to allow of its being ascertained what is to be done in suburban areas. The Town Council held special meetings on Monday and yesterday to consider a proposal to apply for an extension of the burgh boundaries so as to make them coterminous with the water and lighting areas, and for other purposes; and to appoint a Committee to prepare an agreement with the North British Railway Company as to railway facilities at Thornhill. As a result of these meetings, application is to be made for a Provisional Order. The trouble has arisen in this way—that at present gas for Larbert, Stenhousemuir, and Carron is obtained from Falkirk; but there is some talk of new gas-works being erected at Larbert, for the supply of these places. Were this to take place, it is obvious that much smaller works would suffice for Falkirk than would be otherwise necessary. Therefore it is considered by some to be desirable that these places should be brought within the burgh, when, of course, the right to erect works of their own would be taken away. The subject may be handled so as to avoid a party conflict. But the probability is that the Falkirk proposal will not be accepted without conditions; and, if so, it may not be worth while to go on with the proposed extension of boundaries. Either way, the situation is an unfortunate one for an undertaking which has experienced so many misfortunes in its short career.

The Kirkcudbright Town Council have a practice of presenting their annual budget at the last meeting of the municipal year. This has a good deal to recommend it, because councillors who may be seeking re-election go before the electorate under the shadow of their good or bad deeds, as the case may be. Dealing with the gas undertaking,

Wright's

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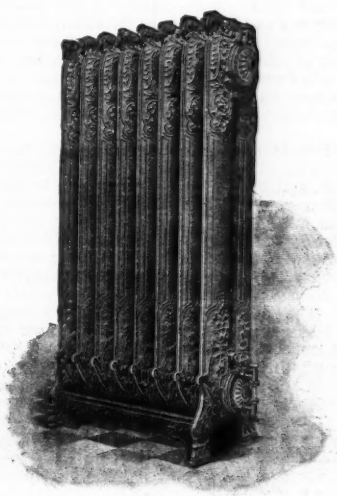
HOT WATER AND STEAM Radiators

(Gas-Heated.)



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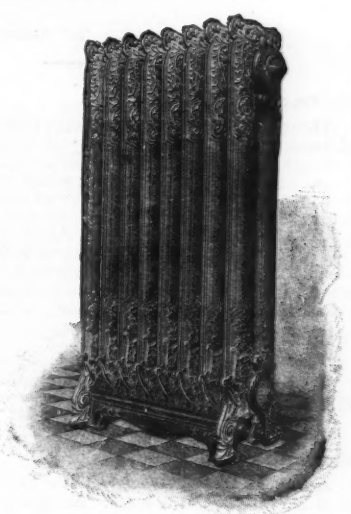

The "St. David" Hot Water Radiator.

SIZES AND PRICES—

"ST. ANDREW" B1304, B1306, B1308, B1310, B1312, B1314.

"ST. DAVID" B1404, B1406, B1408, B1410, B1412, B1414.

No. of Double Tubes	4	6	8	10	12	14
Height	39½	39½	39½	39½	39½	39½ ins.
Depth	10½	10½	10½	10½	10½	10½ ins.
PRICE ..	70/-	97/6	126/-	157/6	189/-	220/-

*(Special Finish.)

*These Radiators can be supplied finished in either Black, Green, or Dark Chocolate Enamel.

JOHN WRIGHT & CO., ESSEX WORKS, BIRMINGHAM.

Bailie Hogg said he considered that it had been fairly successful. The income during the past year was £1082, and the expenditure £677, which left a balance of £405. The charges upon this sum were £322, which left a surplus of £83. Had it not been for the fact that they had to pay £42 of accounts for the previous year, their surplus would have been £125. They estimated for a surplus this year of £183. He wished the Gas Committee to take into consideration whether they were prepared to concede a reduction in the price of gas; but they thought it well to retain it at the present figure for at least another year. Since the introduction of the new retort-bench, the works were coming up to his expectations, and to what he had long advocated. The Gas Committee reported that a disagreement had arisen regarding the tenancy of the Manager's house; and that they made certain recommendations to effect a settlement. The Manager, however, replied that he could not see his way to agree; and the Committee therefore recommended that notice should be given to terminate his engagement. This was unanimously agreed to.

The municipal elections which have been decided this week have not had much interest for those who are concerned with gas supply. Probably the chief question of which I need take notice has been at Broughty Ferry, where there is a party who are not satisfied that the Council dealt justly with the late Manager. So keen was the feeling, that on the eve of the poll Provost Scott attended a meeting of electors, and delivered a long speech in support of the action of the Council. His remarks did not carry in the candidate whom he supported; but in another ward the Provost's candidate was elected, so that the election leaves matters as they were, so far as the balance of parties is concerned. In Perth, the feature of the election was the defeat of Mr. Macpherson at the poll. Mr. Macpherson has fallen more on account of proposals for extension of the tramway service than anything else; but he has been an active agency upon gas matters in the Council, and his sympathies have not been with the Gas Manager nor the Gas Committee.

At the annual meeting of the Monifieth Gas Company, it was reported that the Company, which was formed four years ago, had had many difficulties to contend with, and had hitherto been unable to pay any dividend on the ordinary shares. These difficulties have, however, now been overcome; and after wiping out all preliminary expenses, and making ample allowance for depreciation, the Company are in a position to pay a dividend at the rate of 2½ per cent. on the ordinary shares.

I suppose it was with a view to encouraging steadiness in service that the Aberdeen Gas and Electric Workmen's Friendly Society was instituted four years ago. The annual entertainment of the Society was held on Friday night of last week. Mr. Kemp, the Convener of the Gas Committee, presided, and had beside him on the platform, among others, Mr. S. Milne, the recently elected Engineer and Manager. The Chairman congratulated the Society on their success. He was glad to see so many present, as it showed the interest they took in the Society. Out of 500 workers in the department, 390 were members, which showed very good sense on the part of the workpeople. Since the Society was started, they had paid £268 as sick benefit, £42 as funeral benefit, and £35 as benevolent assistance; and they had at present a benevolent fund amounting to £70.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Nov. 7.*

Sulphate of Ammonia.

Throughout the week the market has remained in a lifeless condition, and buyers have had things nearly all their own way. Agricultural operations having been seriously delayed by an unprecedented rainfall, autumn requirements have been smaller than usual; and extensive purchases were made in anticipation of the strike in Scotland. The matter in dispute having been bridged over, buyers have been under no necessity to make further purchases; while production has been approaching its maximum. Quotations at the close are nominally £12 per ton f.o.b. Hull, £12 2s. 6d. per ton f.o.b. Liverpool, and £12 3s. 9d. per ton f.o.b. Leith. In the forward position, there has been an entire absence of interest unless at something nearer spot prices.

Nitrate of Soda.

This is steady, but quiet, in all positions, and spot prices remain at 9s. 9d. and 10s. 3d. per cwt., for ordinary and refined qualities respectively.

LONDON, *Nov. 7.*

Tar Products.

As a rule, these are firm, with the exception of pitch, which continues dull for forward delivery. As regards the Continent, there is a total absence of business; consumers seeming quite determined to wait until they are absolutely in want of the pitch before contracting. Benzol is very firm. 90 per cent. is reported to have been sold at 10½d.; while an offer of 11d. all over next year was refused by refiners. 50-90 per cent. is not quite so firm. Makers ask 8d. to 8½d.; but the largest buyers offer only 7d. to 7¾d. Solvent continues in very good demand; and prices are advancing. In crude carbolic acid, business is reported in 60's at 1s. 6½d. for January-June; but this was for a special make f.o.b. London, and business was done at 1s. 6d. to 1s. 6¼d. f.o.b. Goole November-December. Crystals are very quiet, with an absence of business. In toluol, there are sellers at from 7¼d. to 7½d.; but buyers offer only 6¾d. to 7d., and are indifferent about the article. The demand for creosote is very strong, especially in London, where it is required for export; but there is very little offering, and the largest makers are believed to be fully sold. The position of anthracene remains precisely the same; and there is no business to report. In tar, there is nothing important to advise. The position remains about the same, but with a tendency to lower prices.

The average values during the week were: Tar, 23s. 6d. to 29s. 6d. Pitch, London, 49s. to 49s. 6d.; east coast, 48s. to 48s. 3d.; west coast,

THE
MAXIM PATENT
CARBURETTOR

For Enriching Gas in Bulk.
Prevents Naphthalene Deposits.

OVER . . . . .
120
MAXIM PATENT CARBURETTORS
HAVE NOW BEEN FIXED.

Among the Companies and Towns supplied are The Gaslight and Coke Company, The South Metropolitan Gas Company, Birmingham, Leeds, Rochdale, Bristol, Sheffield, Oldham, Dundee, Perth, Dunfermline, and many other Works, both large and small, where they have been working in some instances for the past **Ten Years.**

More Gas and Saleable Coke per Ton of Coal Carbonized is produced; saving Capital, Labour, Fuel, Wear and Tear, &c.

THE ENRICHMENT IS INSTANTANEOUS AND PERMANENT.

The Carburettor is inexpensive, easily fixed, and entirely supersedes the use of Cannel.

DEALERS IN
Benzol, Carburine, and all other Naphthas and Oils suitable for the Enrichment or Production of Gas.

For Prices and full Particulars apply to the

Gas Lighting Improvement Co.
LIMITED,
18, Devonshire Street,
BISHOPSGATE, LONDON, E.C.

47s. 6d. to 48s. Benzol, 90 per cent., 10d. to 10½d.; 50-90 per cent., 7¾d. to 8d. Toluol, 7d. to 7½d. Crude naphtha, 3½d.; solvent naphtha, 8⅝d. to 9d.; heavy naphtha, 10d. to 11d. Creosote, London, 1 1/16d. to 1⅛d.; North, 1⅛d. to 1¼d. Heavy oils, 2¼d. to 2½d. Carbolic acid, 60 per cent., 1s. 6d. to 1s. 6½d. Refined naphthalene, £5 to £8. Salts, 24s. to 26s. 6d. Anthracene, "A" quality, 1⅜d. to 1⅝d.; "B" quality, 1d. nominal.

Sulphate of Ammonia.

The market is very quiet for prompt delivery; but for forward, values are fairly well maintained. Beckton is reported to have sold at £12 6s. 3d. for prompt, and at £12 10s. for January-April. The South Metropolitan Company have accepted £12 6s. 3d. for November shipment. In Hull, £12 2s. 6d. is the outside value, and there is very little doing; the demand having been specially for the time being. In Leith, prices are weaker; and £12 2s. 6d. is probably about the actual value. But there is no business to report for prompt; and makers are not anxious to sell forward. In Liverpool, the market is decidedly weaker; and £12 2s. 6d. to £12 3s. 9d. is probably about the actual value.

COAL TRADE REPORTS.

Lancashire Coal Trade.

With the absence of any appreciably increased requirements for house-fire consumption, and the continued indifferent demand for iron-making, steam, and general manufacturing purposes, all descriptions of round coal still hang upon the market, and pits are kept on short time; there being a difficulty generally in moving away even a four days per week output. Prices for house-fire coal remain without quotable alteration; and there is very little probability of any early upward move. The current list rates are scarcely being held to; representatives of collieries in many cases being prepared with concessions to buyers who can clear off promptly surplus quantities. Best Wigan Arley coals remain about 13s. 6d. to 14s. 6d. per ton at the pit mouth, seconds Arley and Pemberton four-feet 11s. and 11s. 6d. to 12s. 6d., and common house-fire coals 9s. 6d. to 10s. 6d. For steam and forge coal, prices are also weak. On inland sales, ordinary descriptions scarcely average more than 7s. 9d. to 8s. 3d. per ton; while for shipment, special clearance lots are being delivered at the ports on the Mersey as low as 8s. 6d. to 8s. 9d., with ordinary quotations 9s. 3d. to 9s. 6d. The continued short time at collieries, and the consequent restriction in the output of slack, is causing engine fuel to be rather scarce at some of the Lancashire collieries. Common slack averages 4s. to 4s. 3d. and 4s. 6d. per ton at the pit, medium 5s. to 5s. 6d., and best 5s. 9d. and 6s. 3d. up to 6s. 9d.

Northern Coal Trade.

There is an increased demand for certain kinds of coal; but for steam qualities the contrary is the case. Some of the collieries are only able to obtain full working periods by making slight concessions to buyers; so that the prices are a little unequal. Best Northumbrian steam coals are from 9s. 9d. to 10s. per ton f.o.b., according to the period of delivery. Second-class steams are rather dull at from 8s. 6d. to 9s., and steam smalls are 4s. 9d. to 5s. The gas coal trade feels the impulse of an improving demand, which will be more noticeable towards the latter part of the month. Durham gas coals vary in quotation from 8s. 3d. to 8s. 9d. per ton f.o.b., according to quality. One or two contracts for sale over the coming year are being made; and the tendency of the prices for these is about 3d. to 6d. per ton less than those under the expiring contracts. Gas coke is now in heavier production; and though there is a steady export, and a larger local use, yet the increased supply tends to make values in the market easier.

Scotch Coal Trade.

The demand does not show any signs of improvement—in fact, prices have been maintained with difficulty; so that whatever improvement was looked for has not been experienced. The prices quoted are: Main 7s. 6d. to 7s. 9d. per ton f.o.b. Glasgow, ell 8s. 6d. to 9s. 6d., and splint 9s. 3d. to 9s. 6d. The shipments for the week amounted to 239,488 tons—a decrease of 2703 tons upon the previous week, and of 23,421 tons upon the corresponding week of last year. For the year to date, the total shipments have been 9,339,131 tons, an increase of 170,006 tons upon the same period of last year.

Increased Gas Consumption in Leeds through Fog.—Owing to the prevalence of fog in Leeds on Friday, upwards of 2 million cubic feet more gas than usual was consumed; 13 millions being burnt instead of the normal 11 millions.

Suicide by Coal Gas.—Last Friday an inquest was held by Dr. G. Danford Thomas, Coroner for Central London, concerning the death of Wallington M'Culloch, aged 50, described as a financial agent, of Wall Street, New York. The evidence showed that deceased came to London from New York early last month on business. He engaged rooms at a boarding-house in Caroline Street, W.C.; but on Tuesday morning he was discovered dead, seated in an easy chair with a blanket wrapped around him and covering his head. Under the blanket was one end of a length of india-rubber tubing; the other end being attached to a gas-burner, and the gas was still turned on. All openings and interstices in the room by which the gas could have escaped were covered or plugged with paper and other things. Police-constable Roberts produced a letter which he found in the room. It was dated Oct. 22, from the Hotel Cecil, and addressed to the authorities of the St. George's Medical College. In it the writer expressed the wish that, in the event of his decease in the City of London, they should accept his mortal remains in the interests of science, and make a thorough examination of his body. Dr. Samuel Lloyd, Police Divisional Surgeon, who had made an autopsy, said death was clearly due to poisoning by carbon monoxide; and the Jury returned a verdict of "Suicide while of unsound mind."

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of advantage from the many found in our Slot Meters are:

1st.—They are Fraud Proof, and Cannot be tampered with through the Slot.

2nd.—The Slot is closed when the maximum number of Coins have been inserted.

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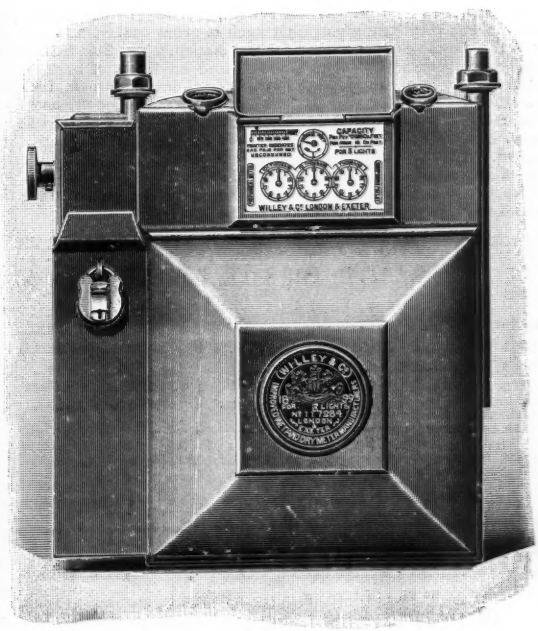

ALL PARTS INTERCHANGEABLE.

Tens of Thousands in use, and adopted exclusively by many Gas Companies.

WILLEY & CO., LONDON AND EXETER.

Increased Water Storage for Southport.—At their meeting on Tuesday, the Southport, Birkdale, and West Lancashire Joint Water Board gave instructions to their Engineer (Mr. H. Rofe) to prepare plans and estimates for a new reservoir at Gorse Hill, to hold 4 million gallons. This will bring up their storage capacity to 6 millions.

Hexham Gas Company.—The Directors of this Company, in their report for the past year, state that the accounts show a profit of £2281; the net balance available for dividend being £2162. Out of this balance, they recommend the payment of the following dividends: On the original shares 10 per cent., and on the ordinary "B" shares 7 per cent., less income-tax; and the payment of a sum of £119 to the ordinary shareholders on account of arrears of dividend. These payments will absorb £1433, leaving a balance of £729. This balance becomes part of the reserve fund under the provisions of the Company's Act of last session.

River Pollution.—Last Thursday, a deputation from the West Riding Rivers Board and representatives from the chief West Riding towns waited upon Mr. Long, at the Local Government Board Office, to ask the Government to introduce a Rivers Pollution Bill on the lines of the recommendations of the Royal Commission, with the additional provision that a universal charge should be made on manufacturers who pollute the rivers. Mr. Long, while admitting the extent of the evil which it was sought to remedy, said he could not, until he had consulted his colleagues, promise to introduce any legislation on the subject next session.

Slough Gas Company.—The shareholders of the Slough Gas Company, at the half-yearly meeting last week, received the gratifying assurance of the Chairman (Mr. R. Martin) that the business is still increasing. The number of new ordinary consumers for the six months was 44, and of prepayment consumers 82. At June 30 last, the total number of slot meters fixed was 350, the income from which amounts to nearly £1000 a year. The increase in the sale of gas during the past half year was nearly 8 per cent.; and as the price has been reduced, there is good reason to hope that this advance will continue. In July, 1901, the Manager (Mr. T. C. Webb) estimated a saving from the new works of £800 per annum; and this has proved to be pretty accurate. The usual statutory dividends were declared.

A New Gasholder at Mansfield.—The formal inauguration of a new holder at the Mansfield Gas-Works took place last Friday. The ceremony was performed by the Mayor (Mr. J. Crampton); and in the course of the proceedings, Alderman Blake, the Chairman of the Gas Committee, explained that they would now have a storage capacity of 790,000 cubic feet. When the original cost of the holder was stated, he was very strongly against such a great outlay, and was determined if possible to get it done for less money. The Sub-Committee visited many places; but they failed to find anything of better value for their money than the designs of Mr. A. Graham, their own Manager. It was therefore decided that tenders should be asked for the construction of a holder with a capacity of 440,000 cubic feet; and the offer of Messrs. Clayton, Son, and Co., of Leeds, at a cost of £8000, was accepted. The Committee also accepted a tender of Messrs. Lane Bros. of £445 for excavations. The Mayor, having turned the gas into the main, congratulated the Committee and the Manager on the splendid work they had achieved.

Large Extensions for Manchester.—The Manchester Gas Committee, having had under consideration the extension of the producing plant at the various gas-works in the city, are desirous that the Corporation should obtain a Provisional Order conferring upon them power to borrow £1,000,000 for the purpose. In connection with the scheme, the Committee have visited Edinburgh and Bristol, to inspect plant that has recently been erected at these places.

The Evesham Town Council have resolved to fit up a sulphate of ammonia plant at their gas-works. The cost is estimated at £584; and the make is expected to be about 24 tons per annum. Alderman Lowe, in making the proposition, said they calculated that the cost of manufacturing the sulphate would be £4 15s. per ton, so that probably the profits derived would soon repay the capital outlay.

At the Mart, Tokenhouse Yard, E.C., on Wednesday, Messrs. Fox and Bousfield sold the 104th part of a King's share in the New River Company for £900; being at the rate of £93,600 for an entire share. These shares have a face value of £100; and though they have been sold for £5 apiece, one not long ago fetched £122,000. On the same occasion, some £10 ordinary shares in the Great Yarmouth Water Company were sold at par.

As an example of the unintelligent tyranny which is sometimes associated with Trade Unionism, the recent experience of an American firm of boiler makers in Jersey City stands almost unrivalled. This firm, according to the "Engineer," employed several men at the rate of $3·75 per day, while the Union rate was only $3. The Union decided upon a strike unless the uniform lower rate were adopted. The firm refused, and a strike followed. Even the men who were paid the higher wages went out on strike. Since then only non-Union labour has been employed in the factory.

The New Hedon Gas and Coke Company, Limited, has been registered with a capital of £20,000, in £10 shares, to adopt an agreement, dated Aug. 11, 1903, and made with H. Ellison, for the acquisition by the Company of the business recently carried on at Hedon by the Hedon Gaslight and Coke Company, Limited; to manufacture and supply gas and light to the borough of Hedon and in the parishes of Paull and Preston, or elsewhere in Yorkshire; and to manufacture and deal in coal tar, pitch, asphalte, ammoniacal liquor, and other residual products, &c. There will be no initial public issue.

According to the Berlin correspondent of the "Daily Express," a State action against the Standard Oil Company has been inaugurated by the Government, who have accepted the view urged by numerous Chambers of Commerce, that the Company's monopoly is a public nuisance. The Prussian Ministry of Railways has issued an administrative order instructing the subordinate authorities throughout the country to boycott the Company's oil, and purchase only Russian and Roumanian petroleum. The Ministry has sanctioned a great reduction in freight rates of Russian and Roumanian petroleum for the purpose of facilitating its importation, in preference to Standard oil, and, further, has prohibited the storage of the Company's petroleum in tanks erected on land belonging to the State railways. It, however, permits the storage of Russian and Roumanian oil. The Saxon Ministry of Finance has issued a similar prohibition in regard to the storage of the Company's petroleum.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

ACCOUNTANT AND BOOKKEEPER. South Shields Gas Company.
WORKING GAS MANAGER. Forster, Malvern.
WORKING MANAGER. Colwall Gas-Works.
MANAGER (GAS AND WATER WORKS). No. 4121.
DRAUGHTSMAN. Maidstone Gas Company.
JUNIOR ASSISTANT. Cambridge Gas Company.
CANVASSER, COLLECTOR, &c. No. 4120.
METER INSPECTOR, CLERK, AND COLLECTOR, &c. Bridgend Gas and Water Company.
GAS-FITTER. Brierley Hill Gas-Works.
GAS-FITTER. Sleaford Gas-Works.

Situations Wanted.

GAS-STOVE TRADE. No. 4119.
JUNIOR CLERK. No. 4122.

Agents Wanted.

"GAS-WORKS," c/o Street's, London.

Plant Wanted.

LAMP POSTS. Redcar Gas-Works.
SCRUBBERS. Widnes Gas-Works.

Sales of Stocks and Shares.

CROYDON GAS COMPANY. Dec. 2.
RUSHDEN AND HIGHAM FERRERS GAS COMPANY Nov. 27.
WEST SURREY WATER COMPANY. Nov. 16.
YORK TOWN AND BLACKWATER GAS COMPANY. Nov. 11.

Meeting of Company.

ORIENTAL GAS COMPANY. London Office, Nov. 18, Twelve o'clock.

BOOKS AND LEAFLETS

TO BE OBTAINED OF

WALTER KING,

11, BOLT COURT, FLEET STREET, E.C.

CONSTRUCTION OF GAS-WORKS.—By S. HUGHES. *Price 5s. 6d.*

GAS LIGHTING.—By CHARLES HUNT. *Price 18s.*

GAS MANUFACTURE FOR STUDENTS.—By J. HORNBY. *Price 5s.*

GAS ENGINEERS' POCKET BOOK. — By H. O'CONNOR. *Price 10s. 6d.*

MODERN METHODS OF SAVING LABOUR IN GAS-WORKS.—By C. E. BRACKENBURY. *Price 3s. 6d.*

MODERN APPLIANCES IN GAS MANUFACTURE. —By FLETCHER W. STEVENSON. *Price 5s.*

ZURICH NEW GAS-WORKS.—By A. WEISS, Engineer of the Works. *Price 2s. 6d.*

THE GUIDE-FRAMING OF GASHOLDERS, and other Papers.—By F. SOUTHWELL CRIPPS, Assoc. M.Inst.C.E. *Price 6s.*

GASHOLDER AND TANK AT THE SUTTON GAS-WORKS (one million cubic feet capacity).—By F. SOUTHWELL CRIPPS, Assoc.M.Inst.C.E. *Price 3s. 6d.*

GASHOLDERS WITH OR WITHOUT GUIDE-FRAMING.—A Discussion between E. LLOYD PEASE and F. SOUTHWELL CRIPPS. *Price 1s.*

THE VALUATION OF GAS, ELECTRICITY, AND WATER-WORKS FOR ASSESSMENT PURPOSES.—Second Edition. By THOMAS NEWBIGGING, M.Inst.C.E., and WILLIAM NEWBIGGING, Assoc.M.Inst.C.E. *Price 5s.*

LAW RELATING TO GAS AND WATER.—By J. SHIRESS WILL, K.C. Fifth Edition. *Price 35s.*

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CONSPIRACY AND PROTECTION OF PROPERTY ACT.—*Price 2s. per dozen*, or 10s. 6d. *per* 100.; printed on broadsides, or on cardboard 12 in. by 9 in.

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CALORIMETRY OF PRODUCER AND ILLUMINATING GASES.—By JOHN F. SIMMANCE, Assoc. M.Inst.C.E., M.Inst.Mech.E. *Price 2s.*

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CHEMICAL TECHNOLOGY.— ELECTRIC LIGHTING. By A. G. COOKE, M.A., A.M.Inst.C.E. PHOTOMETRY. W. J. DIBDIN, F.I.C., F.C.S. 1 Vol. *Price 20s.*

COAL TAR AND AMMONIA.—By GEORGE LUNGE, Ph.D. Third Edition. *Price 42s.*

TREATISE ON THE MANUFACTURE OF SULPHURIC ACID.—By GEORGE LUNGE, Ph.D. *Price 42s.*

GAS ANALYSTS' MANUAL.—By JACQUES ABADY. *Price 18s.*

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ANALYSES OF SCOTCH COALS, CANNEL, SPLINT, SHALE, &c., USED IN THE MANUFACTURE OF GAS.—By (the late) Dr. WILLIAM WALLACE, of Glasgow. *Price 1s.*

Other Books supplied (Post Free) at Published Prices.

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No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under 3s.; each additional Line, 6d.

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SPENT OXIDE purchased in any district.

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For all Joints in connection with Oil-Gas Plant and Sulphate Plant.
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PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.
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Telephone: 1693 Hop. Telegrams: "LUMINOSITY."

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JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.

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MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 248 Holborn.

GAS-STOVE TRADE.

ADVERTISER (Age 36), Twenty Years Experience in the Trade, desires an ENGAGEMENT as WORKS MANAGER, or similar post, or would undertake management of Gas Company's Show-Rooms, &c.
Address No. 4119, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Addresses:
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THE First Dutch Bog Ore Co., Ltd., (Eerste Hollandsche Yzererts Maaty), ROTTERDAM.
General Manager (for England and Wales)—
CHARLES E. FRY, LEAMINGTON; and at Tower Chambers, Brown Street, MANCHESTER.
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E. PADFIELD & CO., 96-98, Leadenhall Street, LONDON, E.C.
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SULPHURIC ACID.

SPECIALLY prepared for the Manufacture of SULPHATE OF AMMONIA.
SPENCER, CHAPMAN, AND MESSEL, LIMITED, 36, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341 AVENUE.

YOUNG Man, age 20, seeks appointment as JUNIOR CLERK, or to take charge of Show-Room. Good all-round experience in Gas-Works routine, Fittings, Stoves, Maintenance, &c. Five Years' good character from well-known Gas Engineer.
Address No. 4122, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WORKING Gas Manager wanted for the Colwall Gas Company. Wages 25s. per week, with good House, Coal, Gas, and Rates, free.
Apply, by letter, to G. H. FORSTER, Solicitor, MALVERN.

AGENTS wanted for a Speciality to be sold to Gas-Works and Chemical-Works. Liberal Commission.
Applications to be addressed, in first instance, to "GAS-WORKS," care of Street's, 30, Cornhill, LONDON.

GAS-FITTER.

WANTED, a good Gas-Fitter. Must be used to Compo. and Iron Pipe work.
Apply, stating Age, Wages required, and previous Experience, to W. C. JONES, Engineer and Manager, Gas-Works, BRIERLEY HILL.

WANTED, immediately, a Practical MANAGER for a Gas and Water Works. Make about 7 millions. Must be thoroughly up in the Manufacture of Gas, Gas and Water Main Laying, Services, &c.
Apply, by letter, stating Qualifications, to No. 4121, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, immediately, for a Provincial Gas-Works, a competent Young Man as CANVASSER, with a knowledge of Gas-Stoves, Incandescent Burners, and General Gas-Fittings. Will also be required to assist, under the Secretary's direction, in Collecting and Meter Inspecting, and General Office Work.
Apply, in own handwriting, not later than the 14th inst., stating Age, Experience, and Salary required, to No. 4120, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CAMBRIDGE UNIVERSITY AND TOWN GASLIGHT COMPANY.

WANTED, a well-educated Young Man of Good Address, to act as JUNIOR ASSISTANT. He will be required to carry out all Chemical Tests on Works, and to devote a portion of his time to advising customers, and advancing the Company's business in the district.
Facilities will be given for his acquiring a thorough Practical Knowledge of Gas Manufacture in all branches.
State Age, Wages, Experience, and References, to
JAMES W. AUCHTERLONIE.
Sidney Street,
Cambridge.

COAL GAS TAR wanted.
Gas Managers in Gloucester, Somerset, Worcester, Devon, Wilts, Hereford, Monmouth, and Glamorgan PLEASE NOTE. BEST PRICE offered, either on Fixed or Sliding-Scale Basis.
State Quantity to offer for Prompt and Forward Delivery.
The SHARPNESS CHEMICAL COMPANY, Tar Distillers, Sharpness Docks, GLOS.

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BALE & CHURCH will be pleased to send Samples and Quotations, and make Offers for SPENT OXIDE.
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WANTED, a Gas-Fitter used to Iron and Compo. Fitting, Cookers, Fires, Prepayment and Ordinary Meters, Main and Service Laying, and General Repairs in Gas-Works.
None but young steady Men need apply, stating References, Wages, Age, and if Married, to H. WIMHURST, Manager, Gas-Works, SLEAFORD.

WANTED, by the Maidstone Gas Company, a good DRAUGHTSMAN, accustomed to the work in a Gas Manager's Office. Wages 30s. per week.
Apply, stating Age and Experience, and with Testimonials, to the undersigned, on or before Wednesday, Nov. 25 next.
H. J. SMYTHE,
Engineer and General Manager.
Gas-Works, Maidstone,
Nov. 3, 1903.

WANTED, a Steady, Energetic Young Man as METER INSPECTOR (Ordinary and Slot), CLERK, and COLLECTOR. Must be of good address, quick and accurate at figures, good Penman, with experience of General Gas Office routine.
Salary 25s. per week, with Quarterly bonus for efficient Collection.
Application, in own handwriting, stating Experience and present Position, with *copies* of Three recent Testimonials, to be sent not later than Nov. 18, to the SECRETARY, Gas and Water Company, Bridgend, GLAMORGAN.

SOUTH SHIELDS GAS COMPANY.

WANTED, at an early date, an Experienced ACCOUNTANT and BOOK-KEEPER, one accustomed to the routine of a Gas Office preferred, to TAKE CHARGE of the Rental Department and the Office Staff under the Secretary.
Salary £200 per annum.
Applications, marked "Private," to be addressed to the undersigned stating Age (which must not exceed 35 Years), Experience, and enclosing *copies* of recent Testimonials.
J. H. PENNEY,
Secretary.
Gas Offices, Chapter Row,
South Shields, Nov. 5, 1903.

WHOLESALE Stock of Incandescent Gas-Light Burners, Chimneys, Globes, and Accessories, for immediate delivery. These goods are of latest design, and in original boxes. Can be viewed Ten a.m. to Four p.m. each day. Tenders to be delivered by Twelve o'clock on Saturday next, Nov. 14.
For Orders to View, Inventory, and Forms of Tender, apply to AUSTINS, Valuers, 3, Budge Row, Cannon Street Station, LONDON, E.C.

WANTED, two dozen Lamp-Posts.
Send Price and Particulars to M. FLIGG, Gas-Works, REDCAR.

WANTED, two second-hand Scrubbers.
One suitable for Works of 25 million cubic feet, and one for Works of 15 millions.
Prices and Particulars to ISAAC CARR, WIDNES.

1500 Feet Cowan Station Meter, with 4-inch Connections and Bye-Pass Valves, in Good Working Order, FOR SALE.
SHEPSHED GAS-WORKS, LEICESTERSHIRE.

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Managers and Secretaries desirous of selling to best advantage please communicate with DENT AND CO., Ouse Chemical Works, SELBY.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

TO BE SOLD—Gas Valves (Six Screw) by Walker, 16 in. diameter; also Six RACK and PINION, by Donkin, same size. Equal to new.
GASHOLDER, 22 feet by 10 feet, with Steel Tank. Self contained.
Write J. WRIGHT, 181, Queen Victoria Street, LONDON, E.C.

FOR SALE—A Crossley Gas-Engine, about 80-Brake Horse Power, suitable for Electric Lighting. The Engine is complete, including several spare parts, and is in first-rate condition. Price £250 f.o.r. for immediate Sale.
Engine can be inspected at the Works of the BRYMBO STEEL COMPANY, LIMITED, near WREXHAM.

TO BE SOLD Cheap:—
Two (18 inch) SQUARE STATION METERS, new drums.
TOWER SCRUBBERS from 3 ft. 6 in. up to 12 feet diameter, in pairs or singly.
Patent WASHERS, 8-inch, 10-inch, and 12-inch, by "Holmes," "Kirkham," "Walker," and "Livesey."
EXHAUSTERS, patent type, from 2000 to 100,000 cubic feet per hour.
CONDENSERS, RETORT IRONWORK, GASHOLDERS, STEEL TANKS.
Every description of New and Second-Hand Gas Plant made and supplied.
Inquiries solicited by J. FIRTH BLAKELEY and Co., Thornhill, DEWSBURY.

WEST SURREY WATER COMPANY.

ISSUE OF DEBENTURE STOCK.

THE Directors of the West Surrey Water Company Give Notice that they are prepared to receive, on or before Monday, the 16th day of November, 1903, TENDERS for £7900 PERPETUAL DEBENTURE STOCK, bearing Interest at the rate of £4 per cent. per annum.

Forms of Tender and Particulars and Conditions of Sale may be obtained from the Secretary, at the Office of the Company, No. 38, Parliament Street, Westminster. London, S.W.

By order of the Directors,
WALTER COLBROOK,
Secretary.

YORK TOWN AND BLACKWATER GAS AND COKE COMPANY, LIMITED.

ISSUE OF £2 10s. SEVEN PER CENT. "ADDITIONAL" SHARES.

SALE BY TENDER OF 1360 £2 10s. SEVEN PER CENT. "ADDITIONAL" SHARES, in pursuance of the Provisons of the York Town and Blackwater Gas Orders, 1890 and 1899.

NOTICE is Hereby Given, that it is the intention of the Directors of this Company to SELL BY TENDER 1360 £2 10s. "Additional" Shares of £2 10s. each (the standard dividend on which is Seven per cent.), to be paid up in full on or before the First day of December, 1903.

Particulars and Conditions of Tender may be obtained at the Company's Office, York Town, Surrey, or of the Secretary, as under.

Sealed Tenders must be sent to the Secretary not later than Wednesday, the 11th day of November, 1903.

By Order,
SIMEON ROWE,
Secretary.

The Gas-Works, York Town, Surrey.
Oct. 17, 1903.

YORK TOWN AND BLACKWATER GAS AND COKE COMPANY, LIMITED.

ISSUE OF TWENTY-FIVE £50 DEBENTURES,
Bearing Interest at 4 per Cent. per annum.

NOTICE is Hereby Given, that the Directors of the above Company, in pursuance of the Provisions of the York Town and Blackwater Gas Orders, 1890 and 1899, have decided to issue Debentures of the Company to the extent of £1250, bearing Interest at 4 per cent. per annum, and payable half yearly.

Forms of Application, which may be obtained at the Company's Office, York Town, Surrey, or of the Secretary, as under, must be returned to me not later than Wednesday, the 11th day of November, 1903.

By Order,
SIMEON ROWE,
Secretary.

The Gas-Works, York Town, Surrey.
Oct. 17, 1903.

Now Ready, Price 15s., Limp Cloth,
AN
ANALYSIS OF THE ACCOUNTS
OF THE
METROPOLITAN WATER COMPANIES
AND OF THE
CORPORATION WATER UNDERTAKINGS
OF
EDINBURGH, GLASGOW, & MANCHESTER.
FOR THE YEAR 1902-1903.
Compiled by
WOOD, DREW, & CO.,
Chartered Accountants.
WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

RUSHDEN & HIGHAM FERRERS DISTRICT GAS COMPANY.

(Incorporated by the Rushden and Higham Ferrers District Gas Act, 1899.)

CAPITAL - £40,000
DIVIDED INTO
£20,000 - - Original Stock.
£20,000 - - Additional Stock.

DIRECTORS:

Mr. E. CLARIDGE, *Chairman.*	
Mr. E. B. RANDALL, *Vice-Chairman.*	
Mr. P. CAVE.	Mr. J. S. MASON.
Mr. J. CLARIDE.	Mr. O. PARKER.
Mr. G. H. GROOME.	Mr. W. RADBURNE.
Mr. C. JOLLEY.	Mr. W. B. SANDERS.
Mr. F. KNIGHT.	Mr. W. SPONG.

Bankers—THE NORTHAMPTONSHIRE UNION BANK, LTD., RUSHDEN.
Engineer and Manager—Mr. THOS. WATSON.
Auditors—Mr. W. H. WILKINS AND Mr. J. T. COLSON.
Solicitors—MESSRS. SIMPSON AND MASON.
Secretary—Mr. G. S. MASON.

SALE BY TENDER OF £4000 ADDITIONAL ORDINARY STOCK

IN THE ABOVE COMPANY.

This Stock has an Authorized Standard Rate of Dividend of
SEVEN PER CENT.
but in all other respects is on an absolute equality with the Original Ordinary Stock.

THE FOLLOWING TABLE SHOWS
THE PROGRESS OF THE COMPANY
Since its formation in the Year 1894.

Year.	Feet of Gas sold.	Price per 1000 Feet. (Subject to a discount of 2d. per 1000 ft. for prompt payment.)		Paid up Capital & Dividends.			
		a.	*b.*	Original Ordinary Stock.	Rate of Dividend Paid.	Addit'n'l Ordinary Stock.	Rate of Dividend Paid.
				£	£ p'r c'nt.		£ p'r c't.
1894	17,104,000	3/6	4 0	10,000	*5		
1895	20,043,000	3/6	4 0	10,000	*6		
1896	28,292,000	3/4	3 10	10,000	*7		
1897	34,356,000	3 1	3/7	13,625	*8		
1898	38,923,000	3/1	3/7	15,000	*9		
1899	48,494,353	2/11	3 5	20,000	*10	3000	*7
1900	61,219,736	2/10	3/6	20,000	10	5000	7
1901	74,185,215	2/10	3 4	20,000	10	8000	7
1902	81,705,608	2/10	3 3	20,000	*10	8000	*7
1903 (Half Year.)	40,094,120	2/10	3 1	20,000	*10 10/-	8000	*7 7/-

a. Engines. *b.* Ordinary. *Free of Income-Tax.

IT WILL be observed from the foregoing table that during the Ten Years the Company has carried on Business, the Sale of Gas has increased from 17,104,000 to 81,705,608 cubic feet, the prices charged for Gas have been reduced from 3s. 6d. and 4s. to 2s. 10d. and 3s. 1d. per 1000 cubic feet, and the dividends paid have increased from £5 per centum to £10 10s. per centum on the original capital. It will also be observed that the Dividend paid last half year on the additional capital was Seven Shillings per centum above the authorized Standard Rate of Dividend.

The rapid progress of the Company has necessitated large capital expenditure, and it is to provide for this expenditure that the Additional Stock is now being issued.

The Directors have recently expended upwards of £4000 in the construction of a Water-Gas Plant. This Plant is now in working order, and it is confidently anticipated that in the future such a saving will be effected in the cost of materials for the manufacture of Gas, that a further considerable reduction can be made in the prices charged to consumers, and that this will be followed by increased sales and consequent increased prosperity to the Company.

The £8000 of Additional Stock already sold has realized an average price of £15 7s. 5d. per £10 nominal value.

Forms of Tender, with Particulars as to making the same, may be obtained on application to the Secretary.

Applications will not be entertained for less than Ten Pounds nominal value of Stock, or for more than One Hundred Pounds in One Tender; but any number of separate Tenders may be made by the same person.

A copy of the Rushden and Higham Ferrers District Gas Act, 1899, can be seen at the Secretary's Office.

GEO. S. MASON,
Secretary.

Secretary's Office,
135, High Street, Rushden.

Last day for Tenders to be received Nov. 27, 1903.

ORIENTAL GAS COMPANY, LIMITED.

NOTICE is Hereby Given, that an ORDINARY GENERAL MEETING of this Company will be held at the Company's Office, Finsbury House, Blomfield Street, London, E.C., on Wednesday, the 18th day of November, 1903, at Twelve o'clock noon precisely, for the following purposes: To receive the Directors' Report and the Accounts of the Company for the Year ended the 30th of June, 1903, to declare a Dividend, and to elect a Director and Auditors in the place of those retiring.

The TRANSFER BOOKS WILL BE CLOSED from the 16th of November to the 3rd of December, both days inclusive.

By order of the Board,
H. J. LUFF, Secretary.

Finsbury House, Blomfield Street,
London, E.C., Nov. 9, 1903.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

(INCORPORATED BY ACT OF PARLIAMENT.)

NOTICE is Hereby Given, that the Half- YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Association was held, at the City Terminus Hotel, Cannon Street, London, on Tuesday, the 3rd inst.—

JOHN HORSLEY PALMER, Esq., in the Chair, when the following RESOLUTIONS were unanimously passed:—

"That the Report of the Directors upon the affairs of the Association be received, adopted, and entered upon the Minutes."

"That a Dividend of 5 per cent. for the Half Year ended June 30th last be declared upon the £3,800,000 Capital Stock of the Association, and that the same be payable, free of Income-Tax, on and after the 10th of November inst."

Cordial Votes of Thanks were passed to the Directors for their able management of the affairs of the Association, to the Chairman for his conduct in the Chair, and to the Staff in London and on the Continent.

By order of the Board,
ROBERT W. WILSON,
Secretary.

21, Austin Friars, London, E.C.,
Nov. 4, 1903.

CROYDON COMMERCIAL GAS AND COKE COMPANY.

SALE BY TENDER OF £5000 CONSOLIDATED "C" ORDINARY STOCK.

MINIMUM PRICE OF ISSUE, £180 PER £100 OF THE STOCK.

THE Directors invite Tenders, at or before 10 a.m. on Wednesday, the 2nd of December, 1903, for the above.

The Dividend on the Stock is payable half yearly, in February and August of each year.

The Dividends for the 18 half years to December, 1902, were at the rate of 9 per cent. per annum, the last nine being paid free of Income-Tax; and for the half year ended June, 1903, at the rate of 9½ per cent. per annum, less Income-Tax.

The net profit earned during the year ended the 30th of June, 1903 (after deducting all charges, including £1560 8s. 4d. interest on Loan Capital) amounted to	£34,458 14 2
This profit was arrived at after carrying to Reserve Fund the sum of	1,500 0 0
And during the same year the Interest on Investments (carried to the credit of the Reserve and Insurance Funds) amounted to	1,091 9 4
	£37,050 3 6

The Reserve and Insurance Funds amounted on the 30th of June, 1903, to £43,639; and the Investments of these Funds (principally in Consols) were valued at £37,894.

Forms of Tender, with Particulars and Conditions can be obtained from the undersigned.

WILLIAM W. TOPLEY,
Secretary.

Offices of the Company:
Katharine Street, Croydon.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

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A Paper read by Mr. CHARLES D. PHILLIPS, J.P., a Director of the Newport Gas Company, before the Monmouthshire Chamber of Agriculture.
Reprinted from the "JOURNAL" for Oct. 13, 1903.
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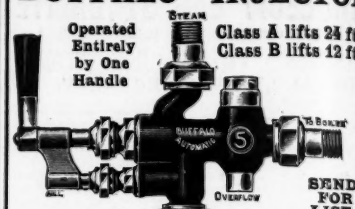

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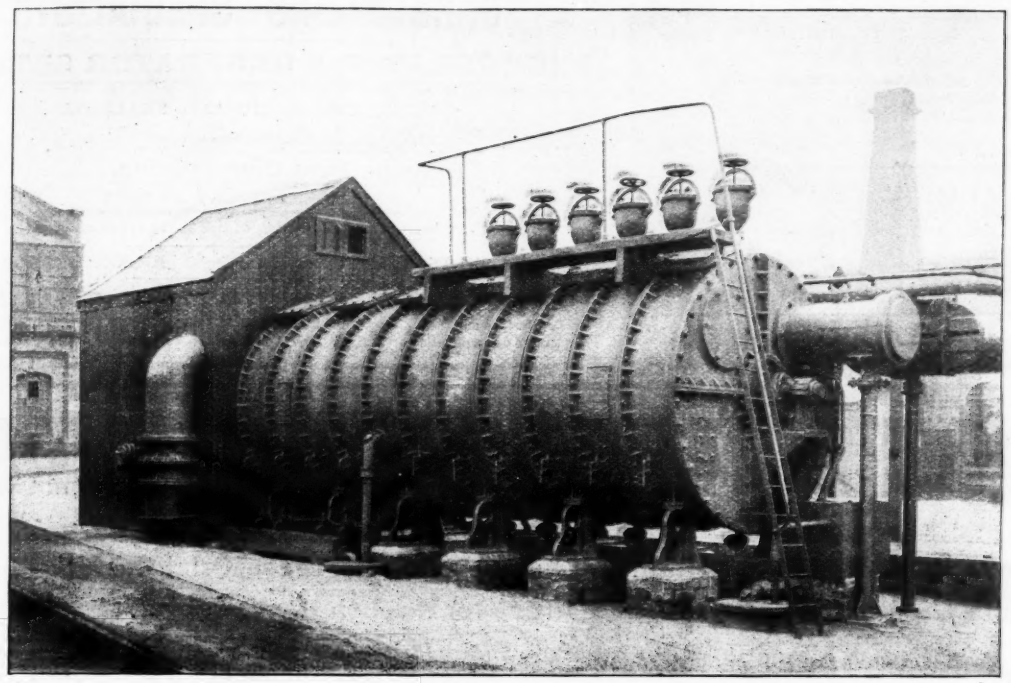

[See also p. 217.]

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[See also p. 217.]

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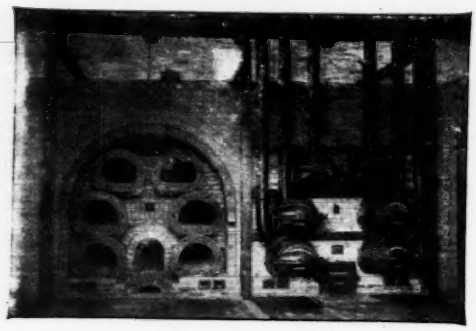

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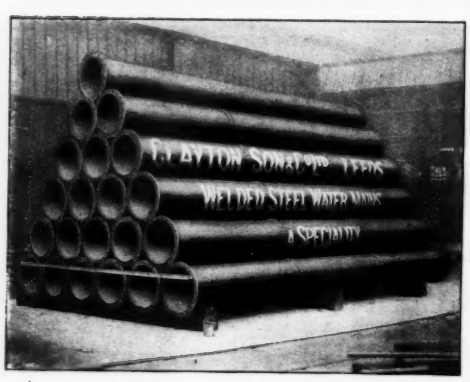

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No. 17.] [*Tuesday, November 10, 1903.*

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Mr. R. SEYMOUR TOBEY, Horley District Gas Company:

"In one case two of your 699 Lamps were fixed in place of three Clusters of 3 each "C" Incandescent Burners, and were much admired."

Mr. J. BECKETT, Swinton Gas-Works, Rotherham:

"The 400 c.p. Lamp you sent is doing well; it is giving more light than seven ordinary Burners, and not costing more than two."

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Mr. W. NORTH, U.D.C. of Stourbridge Gas Dept.:

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Messrs. CLARKE & CHARLES, Harrow Estate Offices:

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The "LANCET" of the 24th of January, 1903, published the Report on this new system of producing radiant heat from Gas, by the introduction of vapour into hot Gases, for the purpose of increasing expansion, by which the same kind of Heat is produced as by the Electric current, at one-tenth of the cost. These Stoves are constructed of Cast Iron without any Sheet Metal Tubes, and supplied black or enamelled in colours.

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SIZE—1 ft. 9 in. wide, 3 ft. high, 7 in. deep.

PRICE.

Fine Cast and Blacked	£3 3 0
Do. with Polished Brass Ornament and Electro-Bronzed Panel	4 0 0
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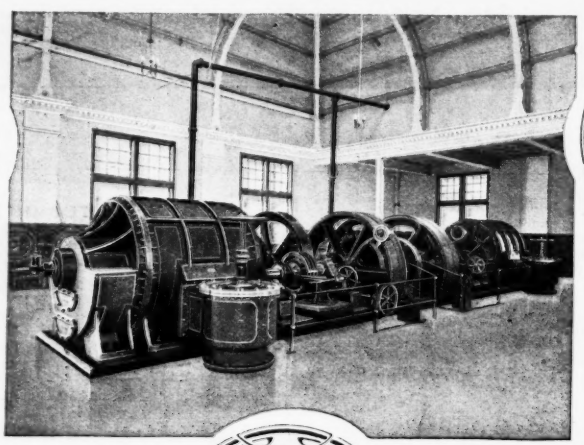

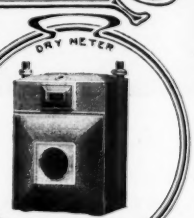

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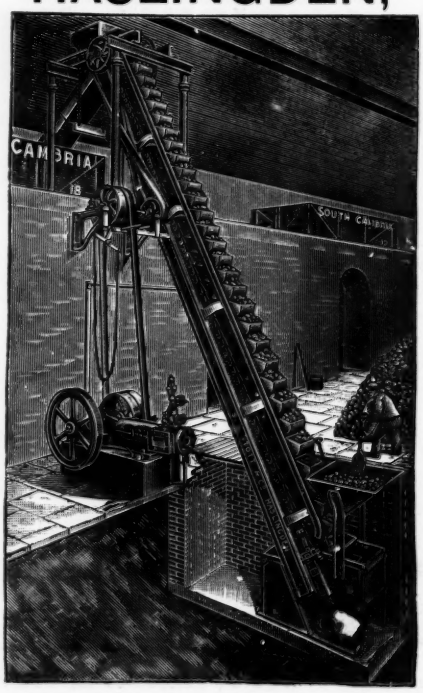

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3 gallons Tar and 20 lbs. Coke produce 1000 cubic feet 10 to 12 Candle Power Gas of the following composition—

Hydrogen	64·4 per cent.
Methane	12·0 „ „
Unsaturated Hydrocarbons	3·0 „ „
Carbon Monoxide	15·0 „ „
Nitrogen and Carbon Dioxide	5·6 „ „
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Calorific Value	400 B.T.U.

See **Prof. VIVIAN B. LEWES'S** Lecture before Society of Arts, reported in the "JOURNAL OF GAS LIGHTING," Dec. 9, 1902.

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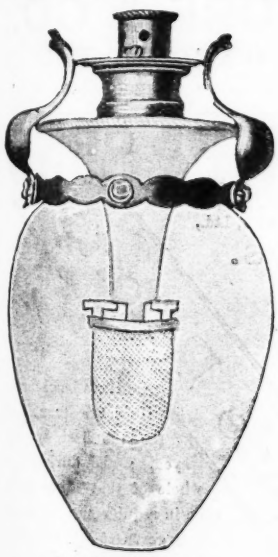

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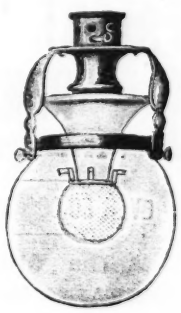

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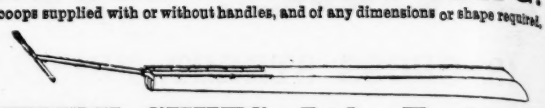

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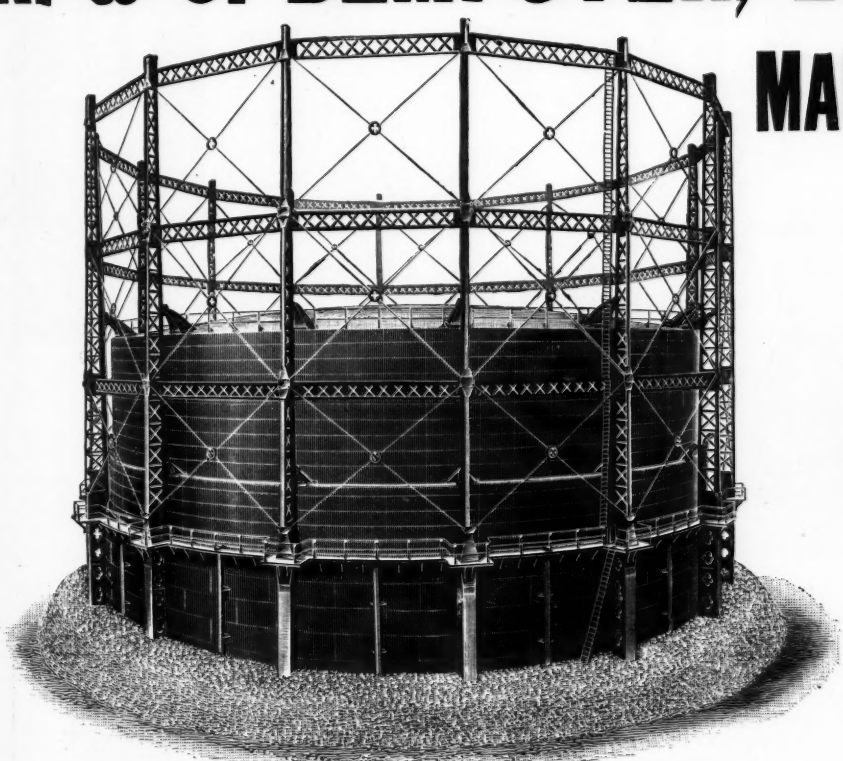

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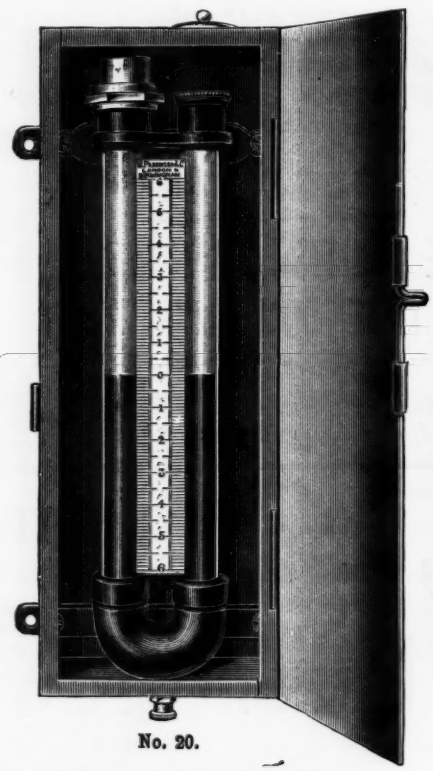


No. 20.

Fig. 2.

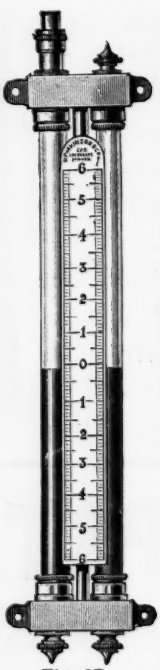


Fig. 3B.

Fig. 1.

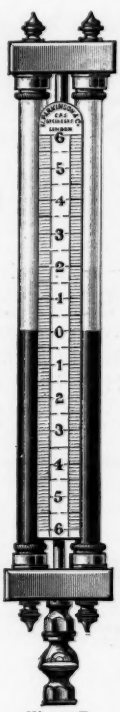


Fig. 5B.

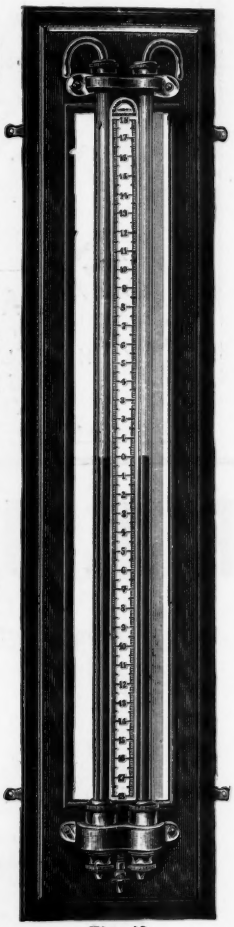
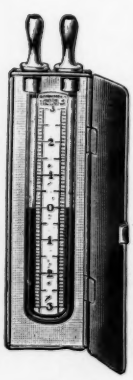


Fig. 10.



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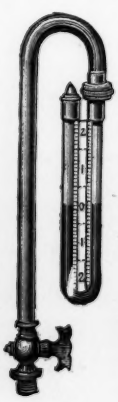

Fig. 6.

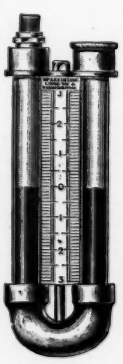

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Fig. 9.

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[See also Advt. p. 340.

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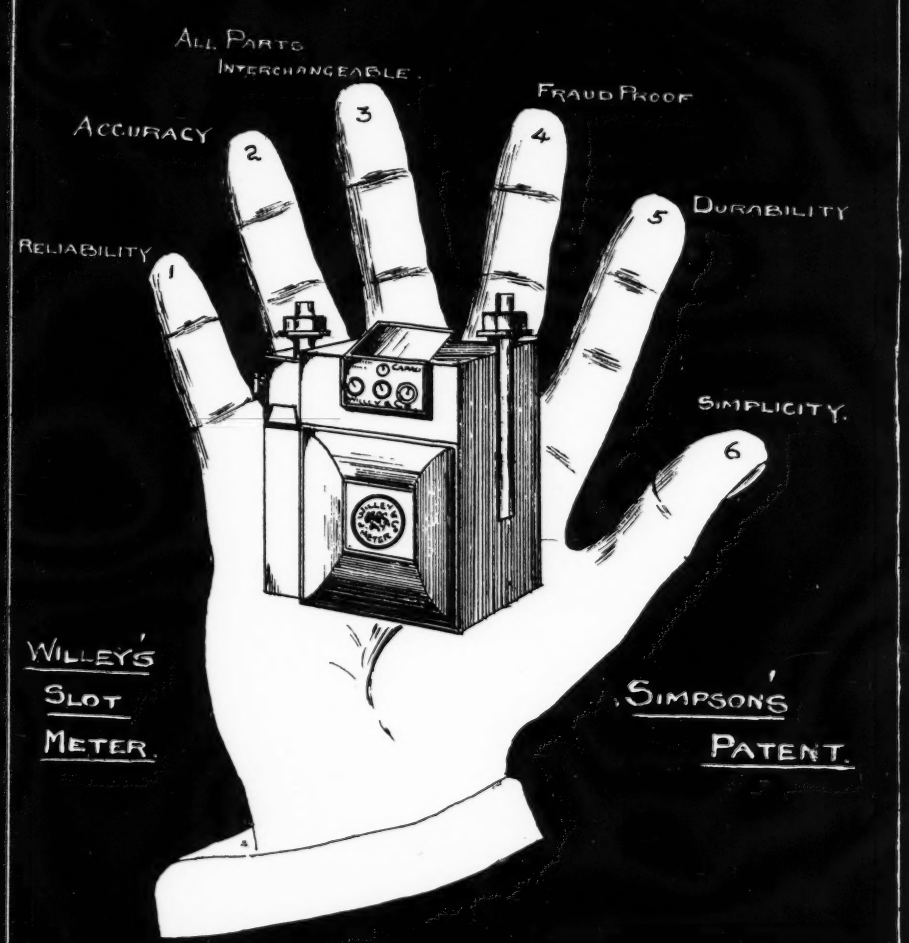

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